IDG.com

FUTURE WATCH

New laser technology could take communication almost anywhere, even to Mars. Page 68

SHIP-TO-SATELLITE

Think remote management is tricky? Try doing it on cruise ships. Page 70

A THING OF IBEAUTY

With a full IT staff and clear mission, e-retail site Ibeauty is sitting pretty. Here's why. Page 54

COMPUTERWORLD

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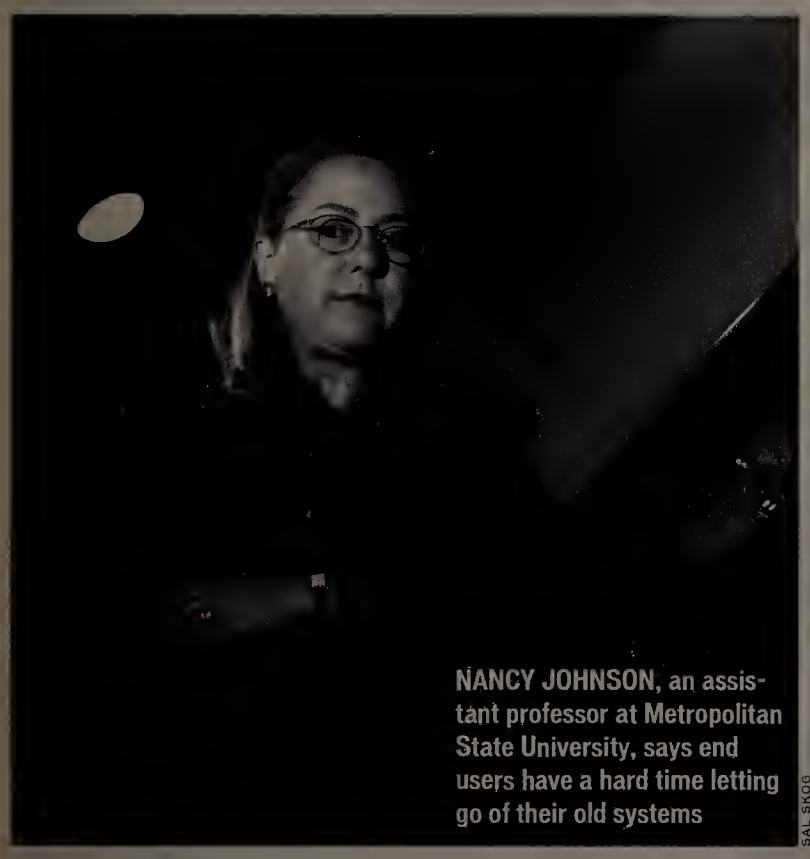

NANCY JOHNSON, an assistant professor at Metropolitan State University, says end users have a hard time letting go of their old systems

SAL SKOG

USER GRIEF

INSIDE, THE END USER IS HURTING. His familiar old computer system is about to be unplugged, and he won't be a power user anymore. Publicly, he's doing what he can to resist — maybe even sabotage — adoption of the new system, hoping it will just go away. Sound familiar? As Kathleen Melymuka reports, IT project managers should recognize that workers mourning the loss of a beloved system go through the same stages of grief as people dealing with a death.

Story begins on page 50.

PRIVACY CONCERNS RANKLE INDUSTRY

Radio 'sniffers' likened to fed e-surveillance

BY BOB BREWIN

The privacy debate is likely to get more heated with the growing popularity of a wireless technology that detects which stations car radios are tuned to and feeds the information to advertisers via the Web.

PRIVACY ISSUES

Mobiltrak Inc., a Birmingham, Ala.-based start-up firm, says it can help focus an advertising campaign by ascertaining which radio stations potential customers listen to in the vicinity of retail outlets.

Mobiltrak uses FM radio "sniffers" that can detect, from several hundred feet away, the

Radio Sniffers, page 16

In blow to sites, FTC pushes for regulation

BY PATRICK THIBODEAU
WASHINGTON

U.S. Federal Trade Commissioner Sheila Anthony has discovered plenty of evidence that she says challenges the idea that industry self-regulation alone can protect consumer privacy on commercial Web sites.

An FTC survey released last week found that many online privacy policy statements ranged from three to 12 pages, were "confusing, contradictory and ambiguous" and often provided no real privacy protection, said Anthony.

FTC, page 16

Report Card

In February and March, the FTC conducted a survey of commercial Web site information-gathering practices:

- Almost all the sites in both groups collected an e-mail address or some other type of personal identifying information from visitors.
- All the top Web sites had posted privacy policies, vs. 88% in the random group.
- Of the sites, 20% had policies that reflect the fair information principles of notice, choice and access security, while 42% of the most popular Web sites met those standards.

Base: Random sampling of 335 Web sites and examination of 91 of the 100 most popular sites

ANTITRUST CASE SWAYS IT PLANS

Companies consider Microsoft fallout

BY PATRICK THIBODEAU

As Judge Jackson brings the Microsoft antitrust case to a close, users are increasingly uneasy about what it means for their Windows rollout plans. Take Kent Maxwell.

"I see this as a big issue. I have a feeling that support for the application and the operating system is going to be shorthanded," said Maxwell, information systems director at Perini America Inc.'s Green Bay, Wis.-based facility, which distributes paper manufacturing equipment. "I am definitely not proceeding into new products like Windows 2000 . . . because I don't know where the support is going to be."

Maxwell isn't alone. In a *Computerworld* survey this month of 104 IT professionals

Microsoft, page 89

Higher Costs?

Do you think a breakup of Microsoft will increase your IT purchasing costs, decrease your IT purchasing costs or have no impact?

Base: 104 IT respondents

COMPUTERWORLD SURVEY, MAY 2000

DATABASE KEY IN AIRLINE MERGER

Customer information crucial to $11.6B deal

BY MICHAEL MEEHAN

So far, much of the talk surrounding the proposed merger between United Air Lines Inc. and US Airways Group Inc. has been about schedules and hub cities. But one of the biggest issues the combined company would face is the consolidation of two of the largest customer databases in the travel industry.

Customer information could be a compelling enough reason to justify Chicago-based UAL Corp.'s plan to buy Arlington, Va.-based US Airways in an $11.6 billion deal that was an-

Airlines, page 89

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IS THERE A CYBERLAWYER IN THE HOUSE?

Chances are, that question may fall on deaf ears. The legal profession isn't keeping pace with the e-commerce explosion, and that's adding to the stress levels of IT managers like Robert Thomas. Page 52

MARTIN TRAILER

GLASS CEILINGS & CLEAR SOLUTIONS

JEANNE STRAIN

It's not just the glass ceiling keeping IT women from the top – it's the whole structure. And the only way to fix it is board by board, says Debra E. Meyerson, a professor at the Simmons Graduate School of Management in Boston. *Computerworld* recently spoke with Meyerson about how IT women can dismantle the barriers to success. Page 53

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45 LATIN AMERICAN users are the focus of online companies, as analysts predict the number of Spanish-speaking Web users will grow from 9 million to 38 million by 2003.

WORKSTYLES

48 CORNING'S IT employees have plenty of opportunities, but they must be willing to work long days, says one manager at the company.

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QUICKSTUDY

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67 REDUNDANT ARRAYS of independent disks use multiple hard disk drives to store data. *Computerworld* offers a primer.

68 LASERS CONJURE up images of medical miracles and space wars, but they're everywhere in modern life and becoming the key to high-speed communications.

70 ROYAL CARIBBEAN bets on wireless remote management of shipboard systems.

72 APPLICATION SERVICE providers must give nonstop service to customers. *Computerworld* goes on-site to see how one ASP does it.

> This is the way human beings react to change that is out of their control.
>
> NANCY JOHNSON, COLLEGE OF MANAGEMENT AT METROPOLITAN STATE UNIVERSITY IN MINNEAPOLIS, ON HER THEORY THAT USERS GO THROUGH THE CLASSIC STAGES OF GRIEF WHEN THEY LOSE AN OLD SYSTEM.
> SEE PAGE 50.

OPINIONS

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36 JOHN GANTZ takes a cue from teen-agers and finds that it takes complementary skills to succeed in e-commerce.

48 GOPAL K. KAPUR says following seven steps can lead to happier IT projects.

60 JOE AUER tells of how a customer's silence — and implied threat — caused a vendor to back down from a hefty price increase.

90 FRANK HAYES says two Web-based firms may have at least a partial solution to IT's never-ending project backlog — micro-outsourcing.

AT DEADLINE

Judge Sides With eBay In Bidder's Edge Suit

A federal judge last week sided with online auction firm eBay Inc. in its antitrust suit against auction aggregator Bidder's Edge Inc. U.S District Court Judge Ronald Whyte issued an injunction, effective June 8, barring Bidder's Edge from using an automated system such as a Web crawler to search San Jose-based eBay's site. Whyte said searches performed by Burlington, Mass.-based Bidder's Edge slowed or had the potential to slow eBay's site. Whyte didn't preclude Bidder's Edge from accessing information on eBay's site by other means. Bidder's Edge said it will appeal the ruling.

Corel Secures Badly Needed Financing

Ottawa-based applications vendor and Linux distributor Corel Corp. last week announced some much-needed extra financing, but it also said two senior executives have resigned. Corel said it has struck a "bought deal" agreement worth $10 million with Canaccord Capital Corp., a Vancouver-based investment firm. "Bought deal" is a term used in securities underwriting that implies a firm commitment to buy an entire issue of shares outright from the issuing company. The executives who resigned are Eric Smith, who was Corel's general counsel, and Sandra Gibson, who was executive vice president of corporate services.

FCC to Hold Spectrum Forum

The Federal Communications Commission (FCC) will hold a public forum Wednesday to discuss plans to create a secondary market for spectrum. The idea is to alleviate the demand created by the boom in wireless services, including high-bandwidth, next-generation cell phone service. Alan Reiter, president of Chevy Chase, Md.-based Wireless Internet+Mobile Computing, compared the secondary market spectrum plans to "a spot market, just like you would have for pork bellies." FCC Chairman William Kennard said he envisions companies trading spectrum via the Web.

Competition Killed Toysmart; Other Risks Taking Online Toll

Insufficient business plans, lack of a brand name to blame in other dot-com demises

BY LINDA ROSENCRANCE

Online educational-toy seller Toysmart.com last week joined the ranks of failed dot-coms, another victim of competition and a corporate investor that was unwilling to take unnecessary risks.

Analysts have attributed recent dot-com problems to the following business issues:

- Lack of profitability or a brand name that can compete with industry leaders.
- Too much attention to marketing and not enough to solid business plans.
- Simple market saturation.

Those problems could strike any Web business, they said, though no one speculated about which company might be next.

Seema Williams, an analyst at Forrester Research Inc. in Cambridge, Mass., said Toysmart.com didn't do anything wrong but fell victim to competition such as Wal-Mart Stores Inc., Toys R Us Inc., Amazon.com Inc. and eToys Inc.

Waltham, Mass.-based Toysmart.com — originally The Holt Co. — launched its site in 1997. It was purchased last August by Burbank, Calif.-based The Walt Disney Co.

The Recovery Group in Boston, which is handling the liquidation, said Toysmart.com owes creditors $21 million. In a statement last week, Go.com Inc., Disney's Internet subsidiary in Sunnyvale, Calif., discussed its decision to close Toysmart.com.

"The online toy market is an incredibly competitive business that has very strong players. ... [W]e concluded that ceasing operations and maximizing the assets of the company was the best course of action," Go.com said.

Toysmart.com executives did not return calls; Disney referred journalists to the statement. Santa Monica, Calif.-based eToys also declined to comment on Toysmart.com, and Paramus, N.J.-based Toys R Us didn't return phone calls.

Slipping Through the Net

Liz Leonard, an analyst at Gomez Advisors Inc. in Lincoln, Mass., said that in the online toy and book markets, consumers default to the firms that have off-line name recognition.

Other struggling dot-coms include London-based fashion retailer Boo.com Group Ltd. and RedRocket.com, which is owned by New York-based Viacom Inc. Both shut their virtual doors this month.

There have also been layoffs at Denver-based online toy retailer KBkids.com Inc. and at Drkoop.com, a health information company in Austin, Texas.

Boo.com, a sportswear and fashion retailer, struggled from the beginning. It was forced to postpone its debut from last May until November because of technical problems.

"It's no surprise that Boo.com failed," said Maureen Stancik, an analyst at Cambridge, Mass.-based Mainspring Communications Inc. "They thought they had the functionality they needed, but [they] didn't."

Net Service Marts Raise Qualification Doubts

But middlemen's savings beckon

BY JULIA KING

The Internet is quickly turning out a new crop of digital middlemen who claim they can help companies negotiate and close outsourcing contracts faster and more efficiently than ever before. But buyers must also beware.

At issue is the quality of the service providers, since many of the new marketplaces do little, if any, real evaluation of the vendors they recommend for users' specific information technology projects.

"The piece that's missing is the vetting of the vendor. At many of these business-to-business sites, there's no qualification. You could be Joe's Fly-by-Night House of Web Services. But you pay your fee, and you're included," said Julie Giera, an analyst at Giga Information Group Inc. in Cambridge, Mass.

On the upside, new business-to-business IT service marketplaces, such as Newmediary Inc., ITradar.com and IQ4Hire Inc., can cut weeks or even months from the process of bringing in qualified technical help from the outside.

The marketplaces also provide at least a partial directory of vendors to the growing ranks of neophyte IT service buyers. Dataquest in San Jose estimates that by 2004, 60% of IT purchasing decisions will be made by people outside IT.

JEFFEREY CAMP

STEVEN NEVILL says confidentiality is a concern at Gerald Stevens

At Chicago-based IQ4Hire, providers must pay to be listed on its Web site. The firm also takes a cut of 3% to 4% of the value of the project from both the buyer and the seller. The marketplace, which is scheduled to launch in July, is aimed at companies with IT projects exceeding $500,000.

Registered buyers use the site's software to plan a project and craft a detailed request for proposals (RFP); then vendors respond. An IQ4Hire implementation expert reviews the RFP process.

"Based on what we know of consultants' billing rates, we then can estimate what the project will run," claimed CEO and co-founder Brian Sommer, a former consultant at Andersen Consulting in Chicago.

IQ4Hire also provides buyers with its choice of the five best-qualified service providers from its list of 200 vendors. Deals are completed off-line.

Other exchanges, including ITradar in Minneapolis, Newmediary in Newtonville, Mass., and ITsquare.com Inc. in Edison, N.J., offer users tools to craft RFPs but don't charge fees. However, Newmediary's and ITradar's vendor qualification efforts are minimal.

"Other than making sure they're not a one-person shop pretending to be a company, we don't go in and check their work. We'd have to have a team of experts to go out and check all of the firms," said ITradar CEO Don Peterson.

Newmediary is developing a rating system through which buyers and sellers can rate one another's performance.

Steven Nevill, CIO at Gerald Stevens Inc. in Tampa, Fla., said he'd be very reluctant to tap any of the new marketplaces for strategic projects. Gerald Stevens is a $300 million floral and gift retailer.

"Through his own knowledge and by asking a few questions, a good CIO could pretty quickly come up with the top five companies that could do certain things," Nevill said.

MOREONLINE

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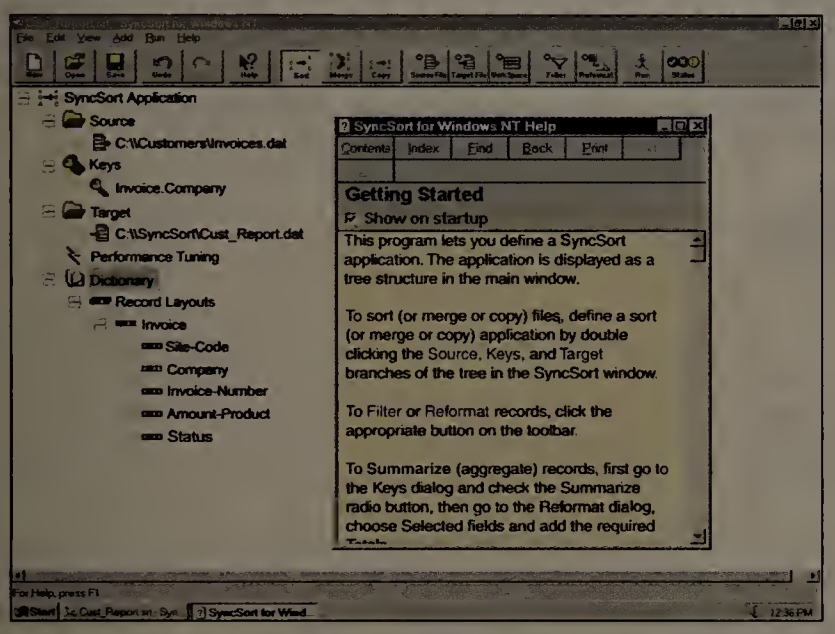

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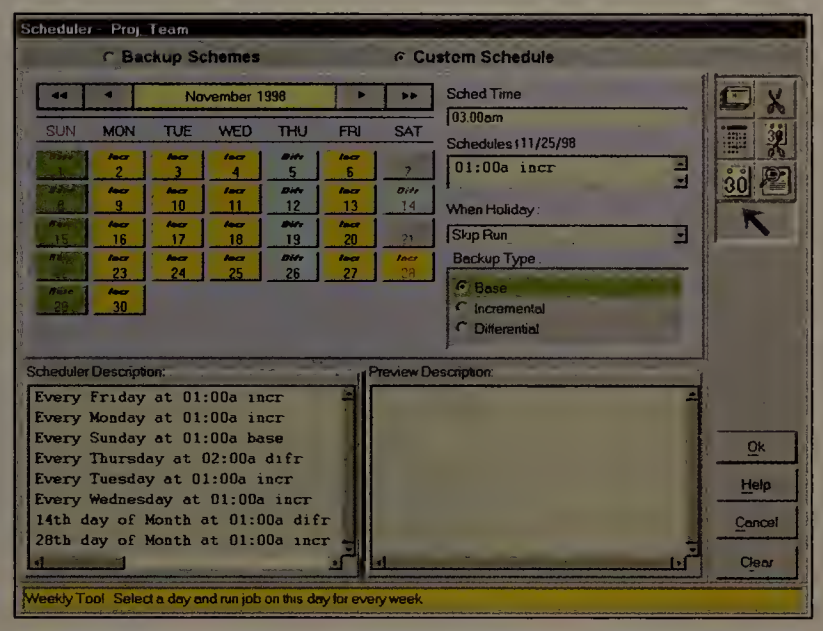

Through the simple, intuitive Backup Express interface, you can schedule backups, run restores, add devices, or check job status.

whether it is running UNIX, Windows NT, or NetWare. Yet centralized administrative control is always maintained through an intuitive drag-and-drop graphical user interface. Support for efficient online and offline database backup is also included.

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Nasdaq Under Fire For Neglecting IT

In latest glitch, exchange rejected messages; Nasdaq blames members' systems for woes

BY MARIA TROMBLY

A MAJOR electronic communications network, Instinet, said its customers were hobbled for an hour last week due to technical glitches in Nasdaq's trading system.

Instinet Corp., a subsidiary of Reuters Group PLC, said a significant portion of its data messages to Nasdaq Stock Market Inc.'s gateway were rejected by the exchange. For about an hour last Tuesday morning, bids for Nasdaq stocks made through Instinet weren't visible to traders.

This wasn't an isolated incident, charged Michael Galano, senior vice president and head of U.S. equities at Instinet. The Nasdaq computer system has been repeatedly plagued by similar glitches, slowdowns and other problems.

But Scott Peterson, a Nasdaq spokesman, said last Tuesday's glitch was an isolated event: There was a bug in a software update that affected a handful of firms. As a temporary solution, those firms reverted to the previous version of the software.

Since then, he said, the problem has been fixed.

However, Nasdaq has come under fire from everyone from Securities and Exchange Commission Chairman Arthur Levitt to one of its own board members.

"There is too much focus on marketing, on sponsoring the Super Bowl, on public relations, on the $37 million sign in Times Square," said board member Alan Davidson, president of Smithtown, N.Y.-based Zeus Securities Inc., head of the Independent Broker-Dealer Association and a critic of recent Nasdaq strategy.

THE ASSOCIATED PRESS

THE NEW YORK STOCK EXCHANGE may postpone its plan to go public in order to focus on the conversion to decimal-based trading

The Instinet problem is only the latest example of its lack of focus on domestic technology issues, he said.

Not so, said Peterson. In January, Nasdaq upgraded from a single switch to a multiswitch link for SelectNet, the computer system that distributes market information to traders. And since then, system delays, if any, have been less than a second long, he said.

If any delays are being experienced, he said, the fault is with the member firms' computers. "Some of them have been using workstations operating at 200 MHz," he said, adding that Nasdaq's minimum standard is 750 MHz. "We are in the process of assisting those firms in upgrading their technology."

Meanwhile, the New York Stock Exchange (NYSE) may postpone its plan to go public in order to focus on the conversion to decimal-based trading from fraction-based.

Richard Grasso, chairman of NYSE, told reporters last week that although the NYSE could have gone public as early as late last year, it won't do so until the second half of 2001, at the earliest.

Possible S&P Security Holes Reveal Risks of E-Commerce

BY JAIKUMAR VIJAYAN

Alleged security flaws in an online service offered by a unit of Standard & Poor's Financial Information Services highlight the risks companies sometimes face as they use the Web to connect with external partners.

Stephen Friedl, an independent security consultant in Tustin, Calif., last week reported security problems with S&P's Comstock service to Bugtraq, a security mailing list.

S&P Comstock is a subscription service that aggregates financial information from more than 140 sources and pumps it to Linux-based clients that sit at each subscriber location.

The problem is that a lack of adequate security controls on those boxes — and, more important, on one of the virtual private networks (VPN) they're hooked up to — makes it relatively easy for hackers to gain access to the networks of some other Comstock subscribers, said Friedl. An earlier report on the problem was posted on Bugtraq in March.

Freedom to Snoop

Such access would give intruders the freedom to snoop around other subscribers' systems and networks, Friedl said. He claimed that while conducting a security audit for a Comstock subscriber, he exploited the vulnerability and detected the networks of other subscribers to show how easy it was to do.

Not all S&P Comstock subscribers are vulnerable. The problem affects only those hooked up to a VPN belonging to San Jose-based Concentric Network Corp.

David Brukman, vice president of technology at S&P Comstock, last week acknowledged that the firm's Linux-based client-side processors could be relatively easy to hack into.

But since the systems are hooked to a secure VPN, "they are not designed to be as secure as devices that would be on a public network," Brukman said. He challenged Friedl's assertion that the holes in the VPN allowed hackers to access systems belonging to other subscribers.

"It is possible that at some point in the past, the consultant may have found some flaw in the network, but the latest audit indicates the network is secure," Brukman said. S&P is shoring up security on its client-side processors and following up with the network provider to ensure total security in the future, he added.

Concentric declined to comment on the matter.

Need for Protection

Incidents such as this highlight the need for companies to protect themselves not just against hackers, but also from the security lapses of business partners they are connected with over the Web, said Ryan Russell, manager of information systems at SecurityFocus.com. The San Mateo, Calif.-based firm moderates Bugtraq.

"The main problem is that you are extending the trust of your enterprise to somebody else, who may have a very different idea of protection," Russell said. "Whether it is a link with a supplier, service provider or a business partner, you need to treat it as a hostile entity" from a security perspective.

Flaw Found In PGP 5.0

BY ANN HARRISON

A security flaw has been discovered in the process by which an older version of Pretty Good Privacy (PGP) reads random numbers, making the cryptographic keys produced by this release of the popular encryption program potentially insecure.

The flaw was found in the PGP 5.0i code base and is specific to Linux and OpenBSD.

According to security researchers, PGP 5.0, created by PGP Inc., now owned by Network Associates Inc. in Santa Clara, Calif., creates public- or private-key pairs with little or no amount of randomness under certain circumstances.

PGP must gather random numbers from reliable sources so that the keys can't be predicted by attackers. Versions 2.x and 6.5 of PGP aren't affected, nor are PGP versions ported to other platforms. Network Associates recently began shipping PGP 7.0. The company wasn't available for comment by press time.

The problem was discovered by Germano Caronni, a researcher in the security research group at Palo Alto-Calif.-based Sun Microsystems Inc., who doesn't speak on behalf of the company. The PGP flaw was verified by other researchers and then posted to the widely distributed Bugtraq security list.

"If I, as a user, wanted to send someone a message using PGP, I would first want to confirm that they were not generating their key with the bad version; otherwise, the crypto isn't very useful," said PGP user Lenny Foner, a cryptography and public policy researcher in Somerville, Mass. "And there is no easy and secure way to do that except to call them on the phone and ask how they generated their key."

Caronni said he was astonished to find the flaw in code that had been publicly available for more than a year. Software such as PGP 5.0 is considered more secure because it's in the public domain and can be reviewed by the technical community.

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BRIEFS

Spanish-American War Tax Axed in House

The U.S. House of Representatives voted 420-2 last week to phase out the 3% federal excise tax on communications services. The elimination of the tax, which was adopted to pay for the Spanish-American War, was recommended in the majority report of the Advisory Commission on Electronic Commerce, the congressional body that recently concluded its work on Internet tax issues. The Senate must also act on the measure.

CompTIA Endorses China Trade Vote

The Computer Technology Industry Association (CompTIA) hailed passage of the House bill extending permanent normal trade relations with China last week. CompTIA claimed that much of the expected $13 billion in increased trade will benefit computer vendors.

FTC Eyes Electronic B-to-B Markets

Business-to-business electronic markets are going to get the attention of the U.S. Federal Trade Commission (FTC) during a two-day workshop next month. The FTC wants to understand how business-to-business markets generate efficiencies and to examine the antitrust issues raised by them. The workshop will be held June 29 and 30 at FTC headquarters in Washington. It will be open to the public.

EpicEdge Wins Online Service Contract

EpicEdge Inc., an information technology services firm and application service provider in Austin, Texas, announced it won a three-year contract from Houston-based Reliant Energy Inc. to develop and and host the $15 billion energy services company's online customer management system.

The new system, which will serve more than 2.5 million customers, will use e-commerce software applications from iPlanet E-Commerce Solutions in Mountain View, Calif.

First U.S. All-Electronic Options Exchange Opens

Faces market downturn, stiff competition

BY MARIA TROMBLY

THE International Securities Exchange LLC (ISE) opened its doors in New York Friday. It is the first new securities exchange in the U.S. in 27 years and the first fully electronic options exchange in the country.

Trading began at 9:30 a.m., with options listed in three securities: LSI Logic Corp., Alcoa Inc. and SBC Communications Inc.

Options trading is different from typical stock trading in that investors don't buy or sell a stock; they buy the right to buy or sell a stock on a specific date for a specific price.

The ISE eventually hopes to offer options on the 600 stocks that inspire 90% of the option-trading market in the U.S.

The Competition

The ISE's competitors are the four existing options exchanges: the Chicago Board of Options Exchange (CBOE), New York's American Stock Exchange, the Philadelphia Stock Exchange and San Francisco's Pacific Exchange.

All four combine traditional trading floors with electronic systems. For example, the CBOE, which is the largest of the U.S. options exchanges, executes 39% of its trades electronically.

The CBOE isn't worried about the threat from the ISE, said CBOE spokesman Gary Compton. The CBOE gives traders access to options on 1,400 stocks, with more than 120,000 types of options available. In addition, the CBOE earlier this month eliminated trading fees for individual investors, though Compton said the move wasn't in response to the ISE's free retail trades.

Given CBOE's elimination of those fees and its larger pool of buyers and sellers, the ISE will face a hard road — particularly considering the recent downturn in the market.

"Anything coming right now may suffer because we're having dramatic volume drop-offs and a lot of the speculative interest we've had in the market has dried up," said Roger Volz, a technical analyst at New York-based Swiss American Securities, a subsidiary of Credit Suisse.

But ISE spokesman Gary Katz said the new exchange does have one major advantage over the existing exchanges: It's faster.

Unlike the traditional exchanges, the ISE centralizes and streamlines all transactions because it doesn't have to deal with legacy systems, according to Katz.

"We're faster because of this," he said. "Our turnaround time is under a second." ◗

Toyota Holds Off on Joining Online Exchange

Cites FTC probe of Big Three venture

BY LEE COPELAND

Toyota Motor Corp. wants in. But the world's fourth-largest automaker blames the Federal Trade Commission's (FTC) ongoing investigation into the Big Three's trade exchange for stalling its drive to join the online venture.

The industry procurement exchange was launched in February by General Motors Corp., Ford Motor Co. and DaimlerChrysler AG to cut purchasing costs.

The Big Three have formed an independent company called Covisint to manage the exchange, which officials claim could potentially handle as much as $750 billion in annual purchases.

The founders have been courting other automakers, and in April, Renault SA and Nissan Motor Co. agreed to join as nonstakeholders. By successfully wooing Toyota, Covisint would have all the top automakers as members.

On the Fence

But for now, the Aichi, Japan-based automaker is still mulling whether or when it will participate in the exchange effort.

"We are in talks regarding GM's trade exchange," said Toyota spokeswoman Veronica Pollard.

Covisint equity stakeholders GM, Ford and DaimlerChrysler decided to scrap individual efforts when they created the joint Web-based exchange.

"Covisint is being scrutinized by the U.S. government," Pollard added. "We want to understand if it will receive government authorization before making a decision."

FTC officials wouldn't comment on the investigation into the venture but said the recent growth of numerous business-to-business markets presents a new challenge for the Washington-based agency.

"We are in a learning mode," said Susan DeSanti, director of policy planning at the FTC. "The FTC is seeking to learn about how B-to-B marketplaces work and better understand how they create new efficiencies and what are their possible effects on competition and consumers.

"The fact that it's online may generate new facts for consideration but in and of itself doesn't create any new antitrust questions," she said.

The FTC plans to hold workshops on antitrust collaboration issues in late June.

Regardless of the FTC outcome, Toyota officials said the company won't seek an equity stake in the exchange if it joins.

A government source said Covisint hasn't yet filed documents required by the Hart-Scott-Rodino Antitrust Improvements Act.

Covisint officials wouldn't comment on the filing.

THE ASSOCIATED PRESS

TOYOTA IS MULLING whether it should join the Big Three's trade exchange, which could handle as much as $750B in annual purchasing

Analysts said that while the exchange was initially pegged to cost $200 million and be operational by year's end, the addition of major participants could delay progress.

"Like many other exchanges being announced, it will take a fair amount of capital and resources to build this thing out, particularly if it's very complex and involved in direct materials and the manufacture of products," said David Yockelson, an analyst at Meta Group Inc. in Stamford, Conn. "You have three or four behemoths all trying to integrate. It's not too much of a surprise that Toyota is hedging its bet." ◗

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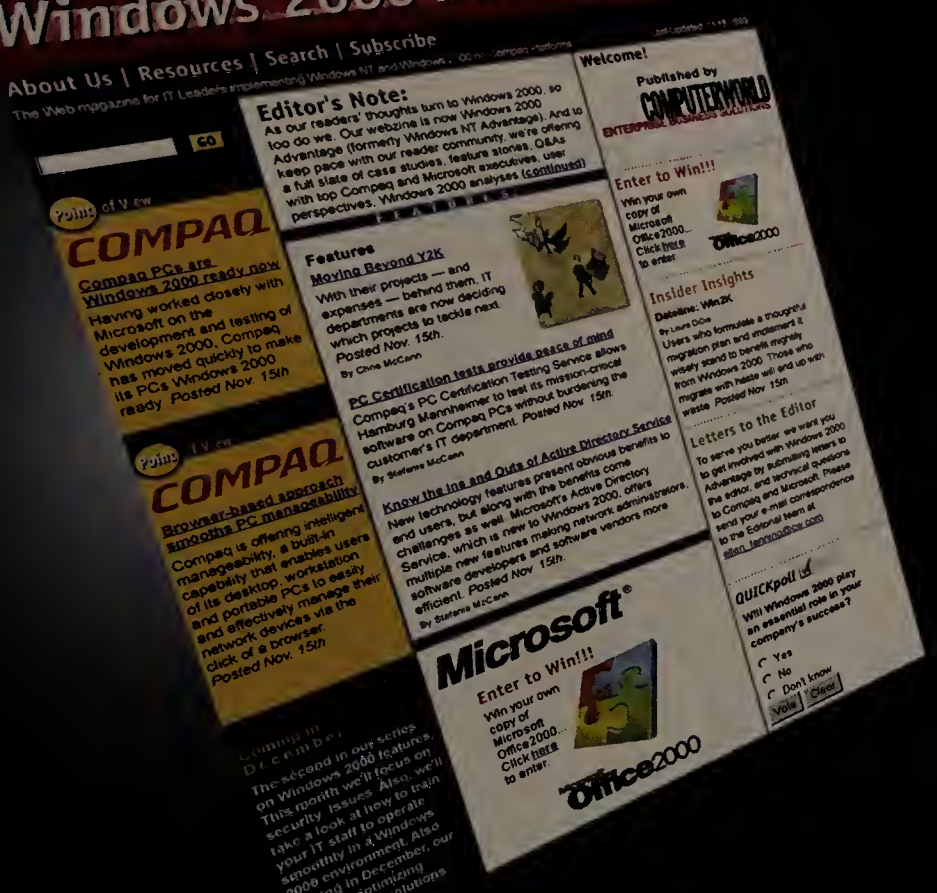

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COMPUTERWORLD
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Postgrad Interns a Gold Mine of Web Talent for Insurer

BY JULEKHA DASH

When Kevin Murray, CIO at New York-based insurer American International Group Inc. (AIG) first began looking for technologists for Web development projects more than a year ago, he found that even consultants with minimal experience were commanding at least $1,000 per day.

Eventually, he found a more cost-effective solution: Partner with a consulting firm to recruit recent university graduates to work on Web projects for six months. During that time, the students would technically be employees of information technology consulting firm Info Technologies Inc. in Shrewsbury, N.J. And at the end of their tenure, they could land full-time jobs at AIG.

"They're setting up a consulting firm as their recruiter," said David Foote, managing partner at Foote Partners LLC, a New Canaan, Conn.-based consultancy that specializes in IT workforce issues. Foote said he hasn't seen many Fortune 500 companies use this strategy to recruit IT talent.

AIG isn't the only company desperately seeking Web-related skills. According to a recent survey of 1,400 CIOs, Web development ranks as the most sought-after IT skill, outpacing networking for the first time in four years. RHI Consulting Inc. in Menlo Park, Calif., conducted the survey.

Productive Partnerships

While many of the recent grads could find full-time Web jobs, about a dozen opted for a paid, six-month internship at AIG to get a chance to work at a Fortune 500 company while dipping their toes in consulting as well, said John Goullet, Info Technologies' president and CEO. Interns are paid the equivalent of $45,000 to $55,000 in annual salaries, said Goullet.

Partnering with a consulting firm saves a lot of overhead expenses, said Murray, who estimated that he's spending about 50% of what it would cost him to hire more experienced full-time employees. Plus, internships allow the firm to add fresh skills to its IT department. "We had kind of an aging development staff, and we weren't really replenishing the skill set with younger kids," said Murray.

Recent graduates are trained in sought-after Web skills such as Java, C++, HTML and XML. "They're coming out in droves with the exact skill set that we need to build for Web front ends," said Murray. Most interns will work on a Web application that enables AIG customers to file workers' compensation and property and casualty claims online.

To train interns on production and project management, Info Technologies has assigned four senior IT consultants who will mentor students while working on-site at AIG.

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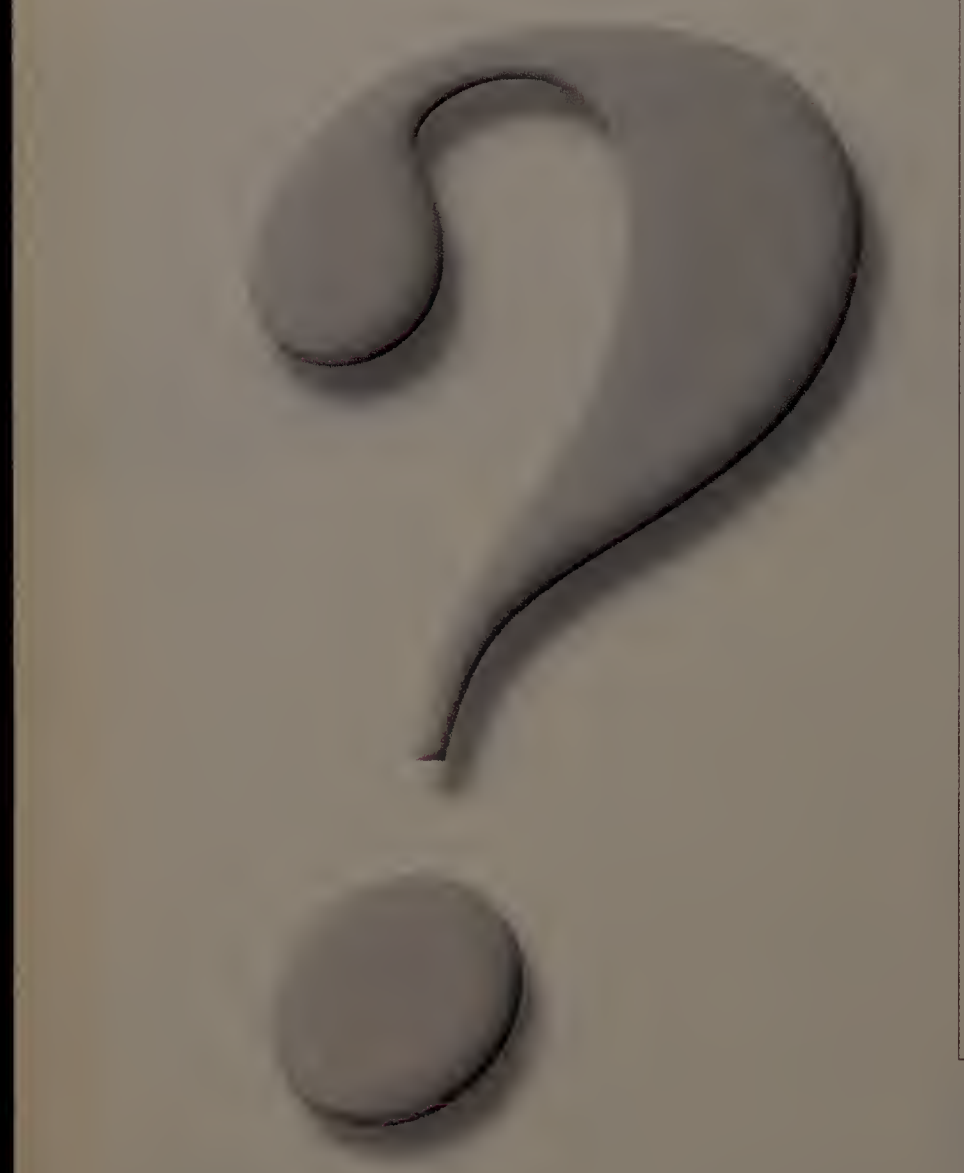

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SAP's mySAP.com to Lower Barriers to Integration

Will incorporate, support other apps

BY JULIA KING

SAP AG HAS finally figured out that it can't do it all.

The German software vendor said it plans to embrace an open-integration strategy under which it will incorporate and support other vendors' applications as part of its Internet-based mySAP.com enterprise computing platform.

ED TOBEN: SAP is "offering to interact with the rest of the world"

Last week at its conference in Berlin, SAP detailed plans for a software starter pack and a new pricing scheme. SAP hopes to persuade users of its R/3 enterprise resource planning applications to adopt mySAP.com.

"The open-integration partner strategy is a complete mind-set change for SAP," said Michael Bittner, an analyst at AMR Research Inc. in Boston.

Under SAP's previous partner program, "anyone could become certified if they put the money up," Bittner said. "With this, SAP is saying they'll selectively choose best-of-class partners, certify them in conjunction with mySAP.com, then assume responsibility for the entire solution."

One recent example of SAP's new strategy is its agreement to embed within mySAP.com customer relationship management (CRM) applications developed by Brampton, Ontario-based Nortel Networks Corp.'s Clarify unit.

"At a certain level, they're maturing to realize that SAP isn't everything to everybody. Therefore, they're offering to interact with the rest of the world," said Ed Toben, CIO at Colgate-Palmolive Corp.

The New York-based company has installed R/3 at sites in 40 countries during the past few years. It's also implementing mySAP.com technology.

SAP also announced a new software release called mySAP.com May 2000, which includes, among other things, upgrades of supply-chain and CRM applications.

Users of R/3 Version 3.1 and higher have until August 2003 to upgrade to mySAP.com under their current maintenance contracts, SAP announced. They can buy traditional licenses for each application, or pay under mySAP.com's role-based pricing model, which bundles software based on users' needs.

The new pricing scenarios are part of SAP's attempt to allow easier integration with other systems, according to an AMR report released at the Berlin conference. The scenarios also allow users to save their existing R/3 investments while phasing in mySAP.com.

But migrating to mySAP.com isn't necessarily easy, said Ben Vettese, director of SAP applications at Elf Atochem North America Inc. in Philadelphia.

"There are so many choices and so much competition out there that I think someone has to do an evaluation within the company to figure out what's best," Vettese said.

IBM Boosts NUMA Servers

JAIKUMAR VIJAYAN

IBM last week introduced a high-end NUMA server that features new Pentium III Xeon chips in another demonstration of the growing scalability of Intel Corp. architecture.

Non-Uniform Memory Access (NUMA) is a technology that ties scores of microprocessors together into one highly scalable box capable of running complex applications and huge databases.

IBM's NUMA servers, which it acquired from its purchase last year of Sequent Computer Systems Inc., support up to 64 processors.

IBM last week released a new model — the NUMA-Q E410 — featuring increased memory and Intel's recent 700-MHz Pentium III Xeon chips, which boost application-level performance by as much as 30% compared with existing NUMA-Q systems, said Steve Fry, an IBM product manager.

IBM's new servers, which coincided with the availability of single- and dual-processor machines based on the new 933-MHz Pentium III chips from Intel, highlight the strides Intel architecture is making in the enterprise.

"Traditionally, the overwhelming impression about Intel systems is that while they may not win on absolute performance, they win on price/performance" against RISC-based systems, said Tony Iams, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y.

But continuing Intel chip advances and the use of its chips in sophisticated, massive systems such as IBM's NUMA servers should start boosting the absolute performance of Intel servers, too, he said.

"RISC players have a clear performance advantage for now. But once [Intel's next-generation] IA-64 starts shipping," users will have a platform that offers at least as much headroom and horsepower as RISC systems, he said.

A-dec Inc., a Newberg, Ore., dental supply company, runs its main Baan Co. production application on a 16-processor IBM NUMA server. The company benchmarked products from RISC technology vendors before choosing the Intel-based NUMA servers.

"We process 100,000 transactions a day. It was my belief that Intel servers just didn't handle that many transactions," said Keith Beardon, CIO at A-dec. "But I've been very impressed. These things scale phenomenally well."

Corporate Software Piracy Tops $12 Billion

ASPs, certificates could offer relief

BY TODD R. WEISS

Lost revenue suffered by software vendors as a result of piracy by corporate users reached $12.2 billion last year and has amounted to more than $59 billion over the past five years, according to a study released last week by two software industry trade associations.

Some of the losses are from companies that unintentionally place software on computers without proper licensing, according to Peter Beruk, vice president of antipiracy programs at the Software and Information Industry Association (SIIA) in Washington, which cosponsored the study.

But often, he said, companies know what they're doing and decide to "pay the piper" only if they're caught.

Users can face fines of up to $150,000 for each program title used without a license, he said. For an office suite with five programs, that could mean a fine of up to $750,000, plus legal fees.

In most cases, the violator must then come into compliance and buy licenses for all users of the software, further increasing costs, he added.

The losses from software piracy would actually be greater than last year's $12 billion if homes and smaller businesses were included.

Some industry developments could preclude at least some of those losses in the future. For example, application service providers (ASP) store programs on central servers for access by end users instead of having customers install the software on their own systems. By controlling access to the software, piracy could be eliminated, Beruk said.

The ASP model "will probably go further" than any other approach in making software piracy less of an issue, Beruk said. "That would be what puts me out of a job," he added.

Anthony Picardi, an analyst at International Data Corp. in Framingham, Mass., said a solution also exists through technologies such as digital certificates, which can be embedded in software so that an application is automatically unlocked only upon proper registration.

Such systems could be easily added by vendors, especially if a large company such as Microsoft Corp. jumped on the bandwagon, Picardi said. "They would be doing the industry a real favor if they would be a real leader," he noted. "[Adding software] takes some extra effort."

However, Microsoft gave up its membership in the SIIA earlier this year after the trade association filed a friend-of-the-court brief in which it sided with the government in its antitrust case against Microsoft (see story, page 89).

IBM's NUMA-Q E410 Server

- Supports from four to 64 Intel 700-MHz Pentium III Xeon processors
- Can be configured with up to 64GB of main memory
- Features multipath I/O and switched fabric Fibre Channel storage-area network for increased availability
- Starting price of $74,000

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BRIEFS

MyCIO Launches VPN Security Services

MyCIO.com in Santa Clara, Calif., has launched VPN ASAP, a family of managed security services for virtual private network (VPN) connections for companies doing business over the Internet. Security managers from myCIO configure, deploy and manage the services from the new myCIO.com/Global Crossing Ltd. center in Phoenix.

Axent Unveils Security Services Menu

Axent Technologies Inc. in Rockville, Md., has unveiled its ServiceShield portfolio of managed security services. Organizations can choose a single packaged service to deploy software to protect a specific electronic-business initiative or outsource their entire e-commerce security infrastructure. ServiceShield includes a range of offerings, from vulnerability assessment and integrity management to firewall and detection response analysis.

Aetna to Sell Life Online

Aetna Group Insurance, a division of Aetna U.S. Healthcare, will sell group life insurance over the Internet. The company's i.Choose program will enable workers to handle a range of tasks, including changes to coverage and beneficiaries, by connecting directly to Aetna through their employers' internal Web sites.

Short Takes

Internet services company NIKU CORP. bought ABT CORP., a project management software company; BSOURCE INC., an Internet marketplace for IT services; and 600 MONKEYS INC., an Internet advertising and marketing firm. . . . FIRST DATA CORP. and ENTRUST TECHNOLOGIES INC. announced a new company last week. PAYMENTWAVE INC. promises to deliver a payment platform for business-to-business exchanges. . . . BMC SOFTWARE INC. announced it plans to buy OPTISYSTEMS SOLUTIONS LTD. for about $70 million worth of stock, enabling BMC to snag the company's electronic-business management software for SAP R/3.

Block Financial Leverages Tax Business With CRM

Evolving firm hopes system will aid customer retention and boost revenue

BY JAMES COPE

BLOCK FINANCIAL Corp. in Kansas City, Mo., last week announced that it would log 5 million customer interactions by June on its new customer relationship management (CRM) system. Block's CRM system was put in place to cross-sell services among the various Block business units, which now include loan and investments services in addition to tax preparation and accounting services, according to Bryan DiGiorgio, vice president of Block Financial's customer service center.

The system went live last November, just in time for tax season and just before Block closed the deal to purchase Olde Financial Corp.

The new system, which uses eFrontOffice from Nortel Networks Clarify eBusiness Applications, a unit of Nortel Networks Corp. in Brampton, Ontario, is also aimed at customer retention, according to company officials. A 1% increase in customer retention can boost revenue by $8.5 million, a Block spokesman said.

The firm will continue to add modules this year for sales and Web customer support, a spokesman said. The company is still refining the Oracle database that houses customer interactions for all the Block business units, DiGiorgio said.

Business Imperatives

Block Financial, which grew out of H&R Block Inc.'s tax preparation business, has 1,600 financial services advisers distributed throughout 190 service centers nationwide.

"It's important to realize that we're now a diversified financial services company, not just a tax preparation service. We have to look at the customer's entire value," DiGiorgio said.

That contrasts with how Block used to operate, he said.

"Previously, we might have seen a customer who called in four times regarding an online tax product as an expense," DiGiorgio said. "But [with an expanded group of financial services], if you discover that person is now purchasing an IRA and an annuity, the customer may have moved to a higher echelon."

DiGiorgio said Block has identified several customer "touch points" — e-mail, telephone, faxes and face-to-face meetings — and wants to capture the customer interactions that come through them for storage in a single database.

Information gleaned from a CRM database can give "a company like Block an opportunity to apply metrics that enhance business and do things they may not have been able to do before," said Denis Pombriant, a senior analyst at Aberdeen Group Inc. in Boston.

> We're now a diversified financial services company, not just a tax preparation service. We have to look at the customer's entire value.
>
> BRYAN DIGIORGIO, VICE PRESIDENT, BLOCK FINANCIAL CORP.

Block is now "enhancing the database," DiGiorgio said.

While defining customer profiles and segmenting customers "by wallet share" are important issues, said analyst Stephen Diorio at IMT Strategies Inc. in Stamford, Conn., one of the drivers for CRM success is training customer-contact employees for different roles. Specific customer-contact people should be responsible for specific sets of customers, Diorio suggested. Otherwise, he said, it's like a kids' soccer game, where all the kids go for the same ball at the same time. ▶

Tivoli Conference Highlights Device Management, SANs

Company poised to benefit from growth in handheld market

BY SAMI LAIS

Tivoli Systems Inc. added compelling new features for managing handheld devices and storage-area networks (SAN), users and analysts reported at last week's user conference in Philadelphia.

Although other software vendors, including framework competitor Computer Associates International Inc., have software that manages handheld devices, Tivoli Device Manager (TDM) offers the broadest feature set, according to Paul Mason, an analyst at International Data Corp. in Framingham, Mass.

TDM runs on a server, with actuating code on each Palm handheld device. Options such as software distribution and inventory management are available now. Versions due later this year will include support for Windows CE operating system and pull technology, which lets users initiate software upload.

Expanding Market

According to Joanne Nightingale, director of distributed systems management for telecommunications and financial services consultancy CGI Group Inc. in Montreal, "The biggest expense last year for [CGI customer] Bell Canada in Toronto was buying handhelds for sales staff."

Bell Canada distributes homegrown applications and, each morning when salespeople synchronize their Palm devices, updates sales-related data, Nightingale said.

At Bayer Corp. in Pittsburgh, the management of handhelds isn't an official issue for the information technology department, said Kent A. McClure, an information technology manager at Bayer. But that day is coming, he added.

Attendees also got a look at a working SAN that sprawled 100 feet across the floor. The SAN comprised switches from several makers, SAN devices from Tivoli parent company IBM and a tape library and several Unix and Windows NT servers from EMC Corp.

Tivoli Storage Manager Version 4.1, announced at the show, has several new or enhanced features, such as automated network backup and adaptive differencing technology.

Adaptive differencing lets the software back up only those parts of a file that have changed since the previous backup. For each file, Tivoli Storage Manager backs up two files — the original and a delta, which represent only the changes between the original and current versions of the file.

The SAN Extension Toolkit for Tivoli NetView network management software will let NetView users manage SANs, LANs and WANs from a single console. ▶

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intel

Continued from page 1

Radio Sniffers

station to which a car radio is tuned. It can do that because every radio receiver is also a minitransmitter.

"This gives us a large-scale, perfectly random sample from 10% to 20% of the passing traffic," said Jim Christian, Mobiltrak's CEO.

Mobiltrak equipment, mounted in unobtrusive shelters about the size of household cable TV boxes, can sample as many as 100,000 listeners per installation per day, Christian said. The company operates in the Phoenix, Los Angeles, Atlanta and Toronto metropolitan markets and in more than 100 stand-alone retail locations outside of those markets.

Privacy advocates said they view Mobiltrak's activities with alarm.

David Banisar, the Silver Spring, Md.-based deputy director of Privacy International, said Mobiltrak is conducting the kind of "random electronic surveillance" carried out by the National Security Agency, which is the government's electronic-intelligence-gathering organization.

Christian said the Mobiltrak technology performs a truly random sampling that doesn't identify a particular vehicle. But Banisar said he worries about the potential merging of the technology with intelligent vehicle highway systems and location-reporting cellular phones that could allow Mobiltrak to zero in on individuals.

"This is a situation like the Web, where information is secretly collected without any discussion of whether it is a good idea," Banisar said.

For subscribers, though, Mobiltrak has provided a valuable service.

Lenny Sage, a vice president at Sage Automotive Group in Los Angeles, said his company, which "spends in excess of seven figures every month" on advertising, has seen a measurable increase in sales by using the Mobiltrak technology to target its advertising dollars.

The company's Universal City Nissan dealership — which Sage said is the largest Nissan dealership in the world, with annual sales of $250 million — used Mobiltrak to determine that it had failed to advertise on a station to which a large number of passing cars were tuned.

"We started advertising on that station, and sales went up 22% in a month," Sage said.

Susan Robertson, a marketing manager at ParkSide Mall in Pinellas County, Fla., began using Mobiltrak's service last October. She said the Mobiltrak data is significantly better than ratings information from The Arbitron Co., a nationwide radio and TV ratings firm based in New York.

"Mobiltrak samples about 85,000 vehicles a week in front of our building," Robertson said.

A spokesman for Arbitron said his company provides the kind of detailed demographics that "radio stations live and die for." He added that he doesn't view Mobiltrak as a competitive threat.

"They don't measure in-home or office listening, and they don't measure AM radio stations," the spokesman said.

How It Works

- **Sniffer radio receivers** are installed in parking lot of retailer
- Receivers zero in on **FM stations** playing in passing cars
- **Tuning information** is sent to data center in Phoenix
- Data center filters out **non-FM** band signals
- **Mobiltrak** collates tuning data and produces a report that's viewable on a private Web site
- Advertiser assesses **tuning data** for cars in its location and then adjusts radio ad buys

Monitoring and More

But the Mobiltrak technology does more than just monitor car-radio usage, Christian said. The company's Phoenix data center houses a 64-bit Compaq Computer Corp. Alpha-based system, as well as five high-powered Intel-based servers. The servers apply sophisticated signal processing algorithms to filter out extraneous transmissions such as signals from aircraft, which use frequencies next to the band for communications.

Christian said that his technology can detect AM stations but that Mobiltrak doesn't deal with AM because the band is "very noisy."

The data center processes millions of records each month from the four major markets, Christian said, and delivers location-specific listening patterns to clients on a password-protected Web site. ◗

CERT Pushes Patch to Fix Security Hole in Office

Cites severity of threat as reason

BY JAIKUMAR VIJAYAN

The Computer Emergency Response Team (CERT), a group at Pittsburgh-based Carnegie Mellon University that monitors security issues, last week urged users to immediately install a Microsoft Corp. patch relating to a previously revealed security hole in Office 2000.

The flaw was first revealed by Boston-based security firm @Stake Inc. L0pht Research Labs on May 12.

The vulnerability made it possible for a malicious intruder to disable macro warnings in Office products, reduce security levels and execute arbitrary code that could spread itself to all the users listed in the Outlook 2000 address book. The problem originated with a Microsoft Office UA ActiveX control that shipped with Office 2000 and component software.

Although Microsoft quickly released a patch addressing the issue on May 15 [*Computerworld Online*, May 17], CERT posted the advisory last week because "we wanted to make sure the community knows about what a serious issue it is," a CERT spokesman said.

"Our advice does differ somewhat from what Microsoft put out, and there have been some disagreements as to technically what is going on here with this issue," the spokesman added.

For instance, a Microsoft posting on the subject said users who have set their e-mail to run in the Restricted Zone on Outlook wouldn't be affected by the vulnerability.

Patch Still Needed

However, that alone may not be sufficient to protect users from this vulnerability if the patch for the Office 2000 UA Control hasn't been applied, said Cory Cohen, a member of CERT's technical team.

"A user can send a piece of malicious script in Outlook that can start Internet Explorer and let it do a lot of bad things," Cohen said.

The Microsoft patch appears to fix the problem and must be applied by users "as soon as possible," Cohen said. The patch is available at *http://officeupdate.microsoft.com/info/ocx.htm*.

In an e-mail response to *Computerworld*, a Microsoft spokeswoman wrote, "To date, this is a purely theoretical issue and no customers have reported the problem to Microsoft." ◗

MORE THIS ISSUE
For more stories on security, **see page 6.**

Continued from page 1

FTC

The FTC survey also found that 42% of the 91 most popular Web sites, and only 20% of 335 Web sites in its random sample, offer consumers the four types of privacy protection the agency deems essential: a notice defining privacy policies, a choice as to how data collected by the site is used, access to that data and assurances that the data is secure.

The FTC is now asking for privacy regulations, and many in Congress agree that something has to be done.

"We've toyed with the problem long enough; it worsens every day," said Sen. Fritz Hollings (D-S.C.) last week at a U.S. Senate Commerce Committee hearing on privacy.

However, industry advocates are urging Congress to hold back and give businesses more time to develop good privacy practices.

"You may find that there are gaps in industry enforcement where government must step in to ensure compliance," said Jill Lesser, a vice president at America Online Inc. in Dulles, Va. "Nevertheless, it is clear that companies are responding to the increasing marketplace demand for online privacy," she said at the commerce committee hearing.

The FTC's vote to seek regulations was 3-2. One opponent, FTC Commissioner Orson Swindle, called the recommendation an "unwarranted reversal" from the commission's prior support of self-regulation.

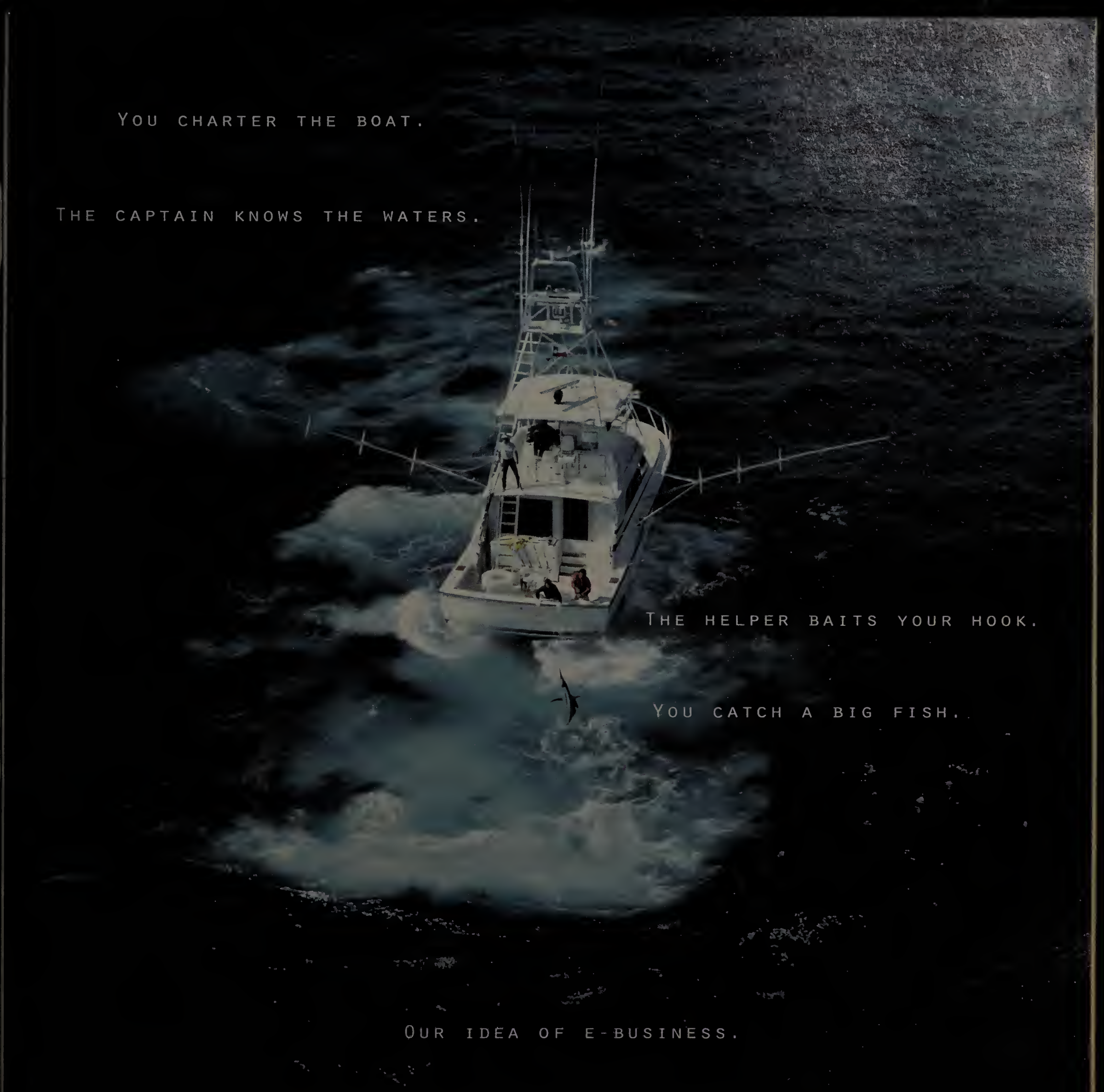
"The majority has abandoned a self-regulatory approach in favor of an excessive government regulation despite continued progress in self-regulation," said Swindle.

Privacy is a high-stakes issue for many online companies that collect and sell personal information. If Congress mandates explicit consumer consent in order to share data with third parties, many business models could be hurt. Companies also worry that a requirement for "access" could increase information technology expenses and other expenses to make the data available to all comers.

But Jason Catlett, president of Junkbusters Corp., a privacy watchdog group based in Green Brook, N.J., said the FTC's conclusions about the state of privacy "were really extremely reasonable and unassailable."

The FTC applied "very easy grades" to the Web sites it investigated, he said. For instance, if a Web site offered any type of access, such as allowing consumers to update their e-mail addresses, the survey scored the Web site as having access.

"And the majority of them still flunked," Catlett said. ◗



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Railroads Invest $10M In Net Services Firm

Venture expected to allow seamless transport of goods across North America

BY LINDA ROSENCRANCE

FOUR RAILROADS have teamed up and invested $10 million in a California company that will help provide one-stop transportation management services for their customers.

The railroads — Canadian Pacific Railway Co., CSX Corp., Norfolk Southern Corp. and Union Pacific Corp. — last week announced an investment in Arzoon Inc. The privately held San Mateo, Calif.-based company has developed Internet transportation technology to help companies procure, monitor and manage services that involve one or more modes of transportation — rail, highway, air or water.

The site will be open to all transportation companies, which won't have to invest to participate, according to Arzoon. It's expected to be up and running by midsummer.

Faced with increasing complaints about poor service, the railroads hope the venture will allow customers to seamlessly transport their goods across North America.

"This is a new way to do that," said John Bromley, a spokesman for Omaha-based Union Pacific. "This is an example of the old economy taking advantage of the new technology."

Len Cocolicchio, a spokesman for Canadian Pacific in Calgary, Alberta, said improving customer service was at the heart of the decision to form the alliance. "We feel this is a way of improving service to railroad customers," he said. "It's a means of using new technology to make interline service seamless."

But Donald Broughton, a transportation analyst at A. G. Edwards & Sons Inc. in St. Louis, said he wasn't very impressed by the news.

"In the long term, it's interesting," Broughton said. "In the short term, [the railroads] have some significant service issues they have to focus on. [What good does it do] to track and trace a snail? Because it's not very far from the last time you checked on it."

Edward Rastatter, director of policy at the Arlington, Va.-based National Industrial Transportation League, a trade group of railroad and trucking customers, said he thinks the new Web site might improve service to customers.

"I don't see how it would hurt," he said. "But I wonder if it's a coincidence these four railroads are the ones opposing the merger of the Burlington Northern Santa Fe and Canadian National."

Arzoon initially was "reluctant to take any investment from any carrier," said Kip Hawley, Arzoon's executive vice president of corporate development. "But we decided to take it from the four railroads because it was the third round of funding, it wasn't start-up money, and because they said they wanted to demonstrate their [service] commitment." ◗

THE ASSOCIATED PRESS

FOUR MAJOR RAILROAD companies are hoping that their joint $10 million venture will quell complaints about poor service

Airborne Secures Piece of Wireless Architecture

Selects mobile dispatch software

BY BOB BREWIN

Airborne Freight Corp. last week tapped Dynamic Mobile Data Systems Inc. to provide mobile dispatch software for its new nationwide wireless architecture. But Airborne will write its own client software for the new Motorola Inc. handheld data terminals it will provide to its 17,500 drivers.

Mark LaRosa, chief technology officer at Somerset, N.J.-based Dynamic Mobile Data, said the contract, whose value he declined to disclose, represents the second-largest deal for the 6-year-old company and was awarded after a one-year pilot with Seattle-based Airborne. The contract with Dynamic Data is a key part of Airborne's five-year project to install a $50 million nationwide wireless architecture, according to David Billings, Airborne's senior vice president of information and technology systems.

The MobileDispatch software enables real-time data communications with drivers and provides status tracking of vehicles and shipments.

LaRosa said the software Airborne will adapt for its own use is compact and well suited for power-sensitive and memory-limited mobile devices.

"The entire application fits in about 150K . . . and with that we can provide guaranteed delivery and notification information and job tracking and vehicle tracking," LaRosa said.

MobileDispatch can work on networks operated by a number of carriers, LaRosa said. Airborne is evaluating proposals from four carriers for its new network: AT&T Wireless in Redmond, Wash., Verizon Wireless in New York, BellSouth Wireless Data LP in Atlanta and Nextel Inc. in Reston, Va. The MobileDispatch software will also support digital signatures to provide proof of delivery, LaRosa added.

AIRBORNE'S DRIVERS will soon carry new handheld terminals

Conrad Steffens, an Airborne programmer, said the company was able to adapt the MobileDisptach software "at minimal costs." Starting with the MobileDispatch core software meant "less risk for us, and it took less time" than developing dispatch software in-house from scratch, he said.

Analysts say Airborne's aging, voice-based system needs to be replaced by a wireless data-based system to meet the challenges of e-commerce.

Real-time tracking information "is a cost of entry," said Jeff Kagan, a telecommunications analyst in Atlanta. "Customers will not even consider a vendor that does not provide real-time tracking." ◗

No Agreement On Mobile in 2.5-GHz Band

BY BOB BREWIN

Delegates to the International Telecommunications Union (ITU) World Radio Conference (WRC) in Istanbul, Turkey, last week remained strongly divided on whether to permit next-generation mobile operations in the fixed wireless band. MCI WorldCom Inc. and Sprint Corp. have spent billions of dollars to acquire licenses for that spectrum.

According to the ITU, "strong support and equally strong opposition" remain to permitting mobile operation in the 2.5-GHz band that MCI and Sprint plan to use to deliver "last-mile" broadband services to business and residential customers.

The European Union's member nations strongly back the new use for 2.5 GHz, viewing it as the "prime candidate band" for next-generation mobile services, according to the ITU. Other countries, including the U.S., have "great concerns with this band because of sharing difficulties with existing systems," said an ITU statement.

David Hawley, an analyst at The Yankee Group, said it hasn't been proven that mobile and fixed wireless services can coexist in the single band.

"Even if [they] can, what will it cost in terms of equipment? You need to look at the costs and benefits" of the sharing proposal, he said.

Andrew Kreig, president of the Wireless Communications Association International, spent a week at the WRC. "It's too early in the game to tell" what the delegates will decide on the 2.5-GHz issue, said, Kreig, whose Washington-based trade group represents the fixed wireless industry.

MCI WorldCom has argued that the wealth of fixed wireless licenses held by it and Sprint is a strong argument for the companies' proposed merger, as the combined company would have the technology needed to bypass local telephone carriers nationwide. ◗

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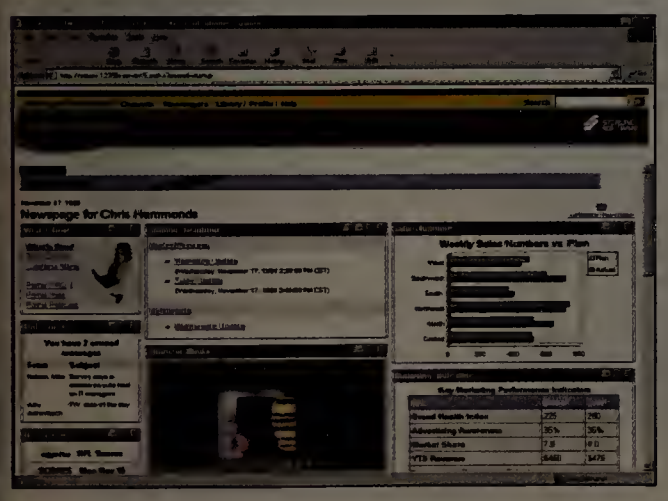

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Mainframe Users Cautiously Eye Distributed Management

BY MARK HALL
LAS VEGAS

Despite record-high desert temperatures outside, users at the BMC Assurance 2000 conference here last week remained cool and cautious to the promise of mainframe-level management services in distributed networks, while some attendees highlighted successful implementations.

"Everything is so well organized on the mainframe. And our networked systems are still pretty new, so our expectations about performance and capacity management are still uncertain," said Gale Warren, a data services assistant manager at The Washington Post Co. in Washington.

Warren, who has 20 years of experience on the mainframe side, said part of the problem is that using distributed tools, such as those offered by companies like Houston-based BMC Software Inc., are mostly new to mainframe users and seem not as easy to use or as comprehensive.

Doug Case, senior capacity planner at American Family Insurance Group in Madison, Wis., agreed. "It's not real intuitive out of the box. There's a steep learning curve," he said.

Payoffs Realized

Still, Case said, there will be a payoff. He cited an instance where BMC's capacity planning tool revealed that an in-house application would fail if deployed.

The project was canned, saving $1.5 million in hardware and support costs at the Fortune 500 home and automobile insurer.

It took BlueCross/BlueShield of Tennessee in Chattanooga more than two months to get BMC's Patrol software working on its 8.5-terabyte Sybase Inc. database, which runs on RS/6000 AIX systems, according to system administrator Rob Jennings.

"Once it was up and running, it was annoying people at night; paging them on their day off. It was great," he said.

Auditors initially questioned using the management software, Jennings said, but the software's ability to predict capacity problems and prevent downtime for the database's 2,000 users established its value for the insurance company.

Health care insurer WellPoint Health Networks Inc. in Thousand Oaks, Calif., is considering consolidating its servers with business-critical applications around IBM's S/390 system in part because of its reputedly superior management tools.

Donald Cleveland, a senior systems engineer at WellPoint, said it's "extremely difficult to measure, monitor and manage" distributed systems at the level that can be used on mainframes. That, along with cost issues, is leading the company to reconsider its server strategy.

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Hearings Spotlight Copyright Clash

Legal exemptions for some materials sought by open-source advocates

BY ANN HARRISON

THE U.S. COPYRIGHT Office recently conducted two days of contentious public hearings at Stanford University in Stanford, Calif., to consider exemptions to copyright law that would permit some circumvention of copy-protection schemes.

Supporters of such exemptions say existing restrictions hinder development of open-source software. Opponents maintain that changes would allow outsiders to exploit protected work without compensating the authors.

During hearings on which classes of works should be exempted under the 1998 Digital Millennium Copyright Act (DMCA), members of the Silicon Valley Linux Users Group held a rally to protest the current law. The protesters argued that the DMCA restricts the fair use of copyrighted material and development of free, open-source software.

"On first blush, this looks to be about money, but it is about power," said Eric Raymond, president of the San Jose-based Open Source Initiative. "Is power going to go to the information monopolies, or will it go to developers and users?"

Anticircumvention provisions of the DMCA were cited by the Motion Picture Association of America (MPAA) in Washington when it filed suit in January to halt distribution of a software utility called DeCSS. The tool enables users to play digital video discs on unauthorized Linux-based players. The motion picture industry said the software could be used for illegal copying.

"It does allow you to copy material to your hard drive, and that is a gateway to piracy," said Steven Metalitz, an attorney who testified on behalf of the MPAA and a group of software developers.

DVD Dispute a Prelude

Robin Gross, staff attorney at the San Francisco-based Electronic Frontier Foundation, testified that movies on DVD should be exempt from the provisions. She cited restrictive region coding that prevents lawfully acquired material from being viewed on players sold elsewhere.

The DVD dispute has been the first skirmish in a larger conflict between proprietary software vendors and developers and users of free, open-source software. Users of devices with free software kernels can modify, redistribute and copy content. Open-source advocates say vendors will use the anticircumvention provisions to criminalize reverse-engineering for the development of compatible, open-source products.

"It outlaws fair use of encrypted content by outlawing the equipment or software you would need to get at that content," said Nathan Myers, an engineer at Zembu Labs Inc. in Palo Alto, Calif. "It outlaws reverse-engineering the encryption in a product to discover what security hole and Trojan horses it might be hiding and offers grounds for prosecuting anyone who would report finding such problems."

Cyberspook Tomlinson Defiantly Speaks His Mind

Defends encryption of communications

BY PHILIP WILLAN
ROME

Western intelligence agencies face little difficulty in intercepting Internet communications, but analyzing all of the traffic is another matter, said Richard Tomlinson, a former officer of Britain's foreign intelligence service, MI6.

Tomlinson has undertaken a five-year cyberwar against his former employer after being dismissed — unjustly, he insists — in 1995.

In an effort to force British authorities to grant him a hearing before a tribunal over his dismissal, Tomlinson threatened to post a damaging account of his time at MI6 on the Internet. He is also suspected of having posted a list of 116 names of alleged MI6 officers on a Web site a year ago.

Tomlinson spent six months in prison after he was convicted of breaching the Official Secrets Act by sending a book proposal to an Australian publisher and revealing secret information — including an alleged British plot to murder Serbian President Slobodan Milosevic — to the press.

Tomlinson denied responsibility for publishing the MI6 officers' names and said his threat to post a memoir was a bluff, which he now regrets. But he said the battle for a hearing by an independent tribunal is still his main focus.

THE ASSOCIATED PRESS

FORMER MI6 OFFICER Richard Tomlinson denies that he published other officers' names on the Web

"Technically, it's easy to gather information, but you need human minds to process it. There just isn't the time," he said, referring to government efforts to monitor his e-mail.

"With people like me, they undoubtedly look at all my e-mail" Tomlinson said of his former employers. "They can't crack PGP [Pretty Good Privacy] without a huge amount of effort." If he didn't use PGP, the secret services might not have to confiscate his PC so often, Tomlinson said.

Few people use the encryption programs on Microsoft Corp.'s Outlook because they know Microsoft gave the escrow key to the U.S. government, he said.

Web Snooping Senseless?

The authorities "want the writers of PGP to give up the key, but then other programs will come along," Tomlinson said. "You can't defeat encryption. It's something the intelligence services have got to learn to live with. They will never defeat it. That's why it's so senseless to spend a fortune snooping on the Internet."

The British government announced last year plans for a $30 million unit of code-cracking specialists to monitor Internet traffic to fight against crime and terrorism. According to published reports, one in 500 telephone connections to the Internet — 20 times the European average — would be monitored. Tomlinson said he doubts that crime fighting is the real motive.

"It's really the intelligence services that are the driving force behind these initiatives, not the battle against child pornography," he said. When he worked at MI6, it was actively recruiting information technology specialists. "But they command such high salaries, they tend to bust the pay structure," he said.

Willan writes for the IDG News Service in Rome.

EU Net Plan Is Approved

BY ELIZABETH DE BONY
BRUSSELS

The European Commission approved its "Action Plan for eEurope" last week, saying that by the end of 2002 it will create the foundation needed to bring Internet access to every European citizen, school and business.

"We must now move fast to eliminate barriers to the uptake of the Internet in Europe," Information Society Commissioner Erkki Liikanen said at a press conference.

The urgency reflects the European Union's belief that rapid access to the Internet and the spread of e-commerce are essential for the competitiveness of the EU economy as a whole. The 30-page plan consists of actions tied to a timetable to the end of 2002.

The plan essentially sticks to implementation of the 10 points outlined in the original eEurope initiative presented by the commission in December.

This time around, however, the commission has grouped the points under three main objectives: the introduction of a faster, cheaper Internet; investment in developing people's online skills; and stimulation of Internet use.

To achieve a cheaper and faster Internet, the commission recommended that by year's end, the local loop be unbundled and that by the end of next year, the European Council, made up of ministers in the cabinets of the EU governments, approve a new legislative framework for telecommunications in Europe. It also set mid-2001 as the deadline for ensuring that all member states have allocated frequencies for multimedia wireless systems.

De Bony writes for the IDG News Service in Brussels.

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BRIEFS

Vignette Set to Acquire OnDisplay

Vignette Corp. in Austin, Texas, plans to acquire OnDisplay Inc. in San Ramon, Calif., in a $1.7 billion stock-swap deal, the companies said last week. Vignette will integrate OnDisplay's XML-based infrastructure products into its new V/5 E-business Platform. OnDisplay's XML technology and Vignette's business-to-business offerings will allow users to more effectively coordinate their business operations and exchange critical business information with customers and suppliers, the companies said.

Philips to Invest $1.2B

Netherlands-based Philips Electronics NV said last week that it will pay $1.2 billion to acquire a 60% stake in medical-transcription services firm MedQuist Inc. in Marlton, N.J. As part of the deal, MedQuist and Philips will jointly develop speech-recognition technology, which the companies plan to roll out between 2001 and 2005. The acquisition will allow Philips to expand MedQuist's services over broadband networks.

Intel Will Put $2B Into Flash Memory

Intel Corp. announced last week that it will invest more than $2 billion during the next two years to help meet the demand for flash chips in wireless communications. Intel recently announced that it sold its billionth flash-memory chip, which the company first introduced in 1988. The chip maker plans to aggressively step up its production process to put out 1 billion more chips within the next two years.

AMD to Sell Unit

U.S. chip manufacturer Advanced Micro Devices Inc. in Sunnyvale, Calif., said last week it has reached an agreement to sell 90% of its communications products division for $375 million to investment firm Francisco Partners LP in San Francisco. The sale is part of AMD's strategy of focusing on the production of PC microprocessors and related products, an AMD spokesman said.

J. D. Edwards Survives Tough Second Quarter

Loses $2.3M, but analysts bullish on future

BY KATHLEEN OHLSON

LAST WEEK CAPPED a difficult second quarter for business software maker J. D. Edwards & Co., which had to deal with a management shuffle, disappointing earnings and hundreds of layoffs.

The Denver-based company reported that it lost $2.3 million for the second quarter, compared with a $10.4 million loss for the same period last year. That announcement came on the heels of a decision to cut 800 jobs from its workforce of 5,400 employees.

Although J. D. Edwards pared its loss considerably since last year, Wall Street had expected a profit.

But there is some good news: Despite the company's difficulties, many customers are rallying behind it.

"The company has always been favorable to us" with its product support, said Dennis Pfeil, director of information systems at Milwaukee Electrical Tool Corp.

Strong customer support isn't necessarily enough to sway financial analysts.

J. C. Simbana, an analyst at American Fronteer Financial Corp. in Denver, said the layoffs and poor second-quarter earnings couldn't come at a worse time for J. D. Edwards, which is struggling to gain sales momentum in the aftermath of the year 2000 problem.

"With these types of events, it's difficult to see a positive impact on the quarters going forward," he said.

At the same time, some analysts remain bullish about J. D. Edwards' future.

"The layoffs send a wrong message, but perhaps they were dead wood," said John Bermudez, an analyst at Boston-based AMR Research Inc. J. D. Edwards' prospects are "pretty good," especially if it's successful in implementing Ariba Inc.'s Tradex Commerce Center platform to develop trading communities for customers, Bermudez said. J. D. Edwards and Mountain View, Calif.-based Ariba inked a reseller agreement in January.

In order to move to the Internet, analysts said, J. D. Edwards will have to aggressively revamp its marketing strategy.

But not everyone is convinced the Internet track is the best avenue for the software maker to take at this point.

"Forget about e-business and look at collaborative business" for customers, said Ed Markowitz, market analyst and editor of "ERP Strategy," an independent newsletter. He said J. D. Edwards needs a strong sense of business processing like that of its rival, SAP AG. Doug Massingill abruptly resigned last month from the CEO position and was replaced by company cofounder C. Edward McVaney.

J. D. Edwards spokesman John Sawyer said the company "has made bold strides" recently by restructuring and repositioning itself in the market. Further positive steps will be taken in the weeks ahead, Sawyer said, including items to be announced at J. D. Edwards' Focus user group next month.

AT A GLANCE

In Review

Software maker takes three wallops in last financial period:

- **Sales** for the second quarter, ended April 30, totaled $231 million, compared with $231.6 million for the same period last year.
- **Losses** totaled $2.3 million, compared with $10.4 million for the same period last year. Analysts expected J. D. Edwards to turn a 2-cent-per-share profit.
- **800 layoffs** in its training centers and sales regions. Several firms report the layoffs were widespread, including sales, development and middle management staff.

Novell Reorganizes After Bad Showing

Blames drop in reseller package sales

BY CLARE HANEY AND TODD WEISS

Networking software vendor Novell Inc. last week announced a dramatic reorganization of its operations and released weak financial results for the most recent quarter.

Plans for Novell's reorganization call for the company to be split into four business units: Net Management, Net Directory, Net Content and Novell Customer Services.

The company blamed its problems on its resellers plunging sales of its packaged software. Novell warned earlier that revenue and earnings would be lower than expected for the quarter ended April 30.

"There has been a stark decline in [sales of] our packaged software," said Eric Schmidt, Novell's chairman and CEO, during a conference call last week. "We underinvested and underfocused on an important area. We intend to fix that."

Revenue from indirect sales of Novell's packaged software in the second quarter was down by about 50%, Schmidt said. He said he hopes to put the reseller-channel issues behind the company by early next year.

"There needed to be a shakeup, especially in the marketing and sales there," said Steve Shepich, an analyst at Olde Discount Corp. in Detroit. Novell has good products, "but these guys are not the best marketers," he said.

Norman Fuchs, an analyst at M. H. Meyerson & Co. in Jersey City, N.J., said Novell missed an opportunity to capitalize on delays in the release of Microsoft Corp.'s Windows 2000, which finally shipped earlier this year.

"I think [Novell's] management basically blew it," Fuchs said. "They gave out the wrong marketing and sales messages." The problems could be seen as early as six months ago, when many of the company's top sales managers departed en masse, he said.

Stewart Nelson, Novell's chief operating officer, said the company plans to "carve out specific segments of Novell's market for the indirect channel and eliminate conflict with direct sales, which will be a huge change for us."

Meanwhile, in an attempt to make the vendor more market-driven, each of the new units will have its own business strategy and distribution channels, according to Nelson.

The Net Management unit will encompass many of Novell's products, such as the company's NetWare operating system and its GroupWise groupware technology. The Net Directory unit will be responsible for Novell's directory software, while Net Content will focus on application delivery services, caching and content exchange for dot-com companies. Novell Customer Services will be in charge of customer services.

Schmidt remained upbeat about Novell's prospects. "I'm confident we'll overcome the transitional issues," he said.

Haney is a correspondent for the IDG News Service.

Novell Sags

The second quarter brings disappointing numbers for the network software vendor:

* Includes one-time $35 million royalty from Caldera Inc.

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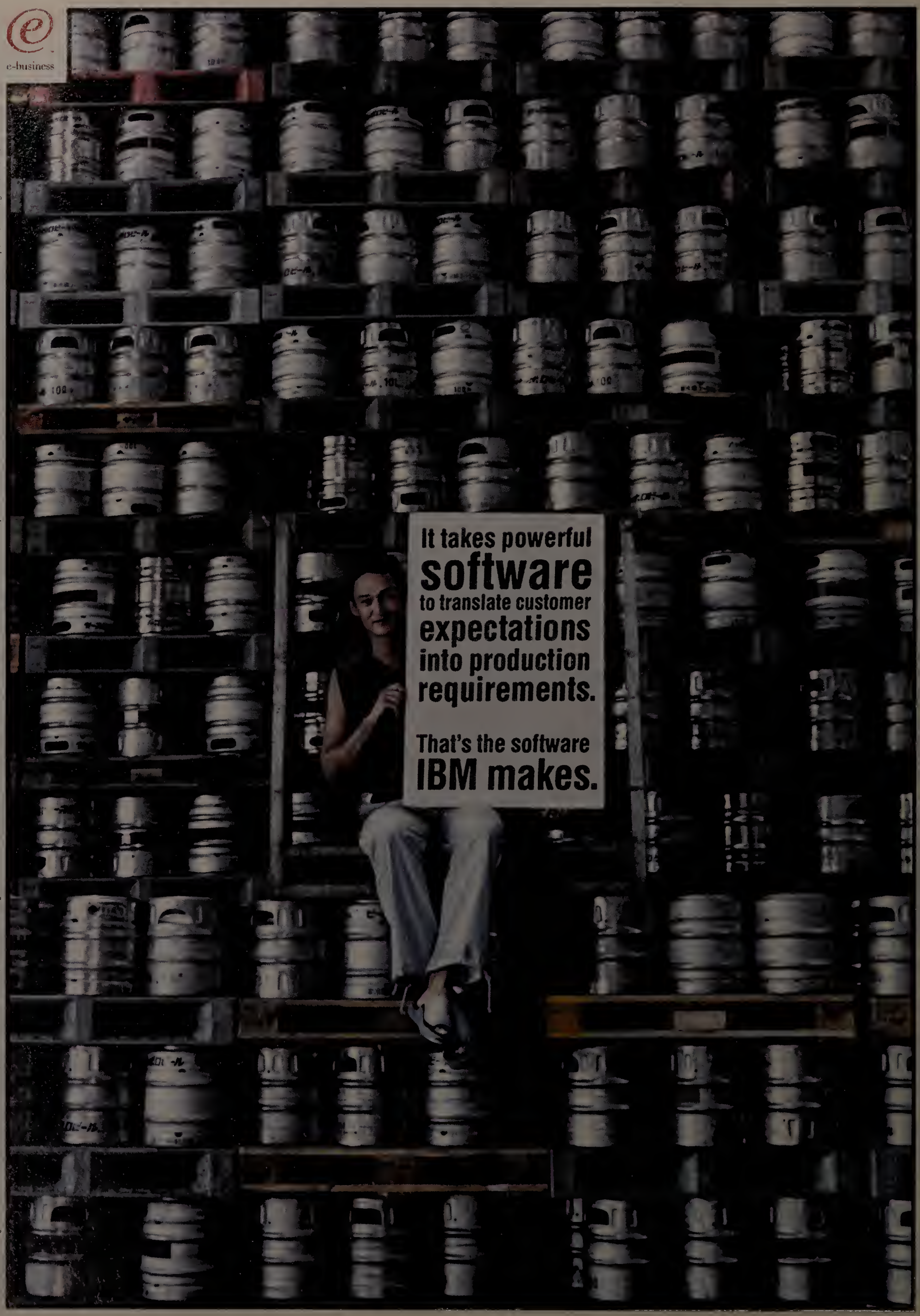

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MARK HALL

Infinite problems

WHEN I FIRST heard EMC Corp. CEO Mike Ruettgers give his stump speech on how data storage is eclipsing servers as the focal point for data center strategies, I thought it was merely self-serving palaver. But his words are ringing true today with many CIOs who find data storage their thorniest problem.

MARK HALL is *Computerworld*'s West Coast bureau chief. You can contact him at mark_hall@computerworld.com.

The so-called New Economy is the reason. Online businesses are based largely on information, so they gather and generate bits by the terabyte. Excite@Home, for example, surpassed the 100TB mark in less than two years, while relative newcomer Driveway.com accumulated 40TB in only 90 days. This isn't information that can be sent to some distant archive. It's core to the business. In many cases, it *is* the business.

Some IT planners are pinning their data management hopes on interoperable storage-area networks (SAN). Others, unable to wait for vendor agreement, are moving quickly to proprietary SAN approaches. It's possible that SAN vendors will agree to standards and, in so doing, stave off the looming data-management crisis. But their sluglike pace so far indicates that it's more likely that they simply see the crisis as a way to sell more mass storage systems.

There could be an alternative. Inside national research labs such as Lawrence Berkeley and Los Alamos, scientists have long been wrestling with terabyte data management issues. In fact, they are already working on applications that depend on petabytes — or a million-plus gigabytes — of data.

Of course, they have thrown lots of hardware at the problem. But applications in areas of global warming, high-energy physics and the human genome project generate data that scales beyond even the biggest disk farms. So, oddly enough, they have resorted to tape. Yes, slow, ponderous, but virtually infinite tape systems.

With them, scientists developed methods for accurately predicting what data a given application will need and when, then retrieving it quickly from ready tape systems so that the program doesn't have to wait.

It will be a while before these techniques can be commercialized — if ever. But at the rate SAN standards are coming, they may get here in time to provide an inexpensive alternative to the data management dilemma.

DAN GILLMOR

Rx for viruses: Get tough with e-mail attachments

THE RECENT "LOVE BUG" virus/worm and its progeny have spawned the usual amount of publicity, accusations and suggestions. IT folks have been hearing all of them, but let me add one idea for consideration:

Ban e-mail file attachments.

OK, I'm not suggesting an outright ban. Some files, such as JPEG and GIF images and PDF documents, are perfectly fine to open up and view because they don't have the ability to run programs on your PC.

DAN GILLMOR is technology columnist at the *San Jose Mercury News*. Contact him at dgillmor@sjmercury.com.

And, yes, sometimes it's convenient to just send along a Microsoft Word document, especially if several people are working on it inside the company and need to track changes. But these should be exceptions to my First Rule of E-mail: Keep It Quick.

I realize this lets off the hook one of the roots of the problem, Microsoft, which has persistently exposed computer users to a variety of threats in the name of adding seldom-used features to products, and often in the name of ease of use and integration. The ability to automatically run scripts and macros from e-mail, for example, is of dubious value to most users. The government's proposed breakup of the company might be a great benefit if it caused a little less of the kind of integration that, in turn, causes virus and worm authors to salivate.

At least Microsoft is beginning to make the right noises on this issue. Any company that doesn't immediately download and install the upcoming fix for the Outlook vulnerabilities is just begging for more trouble.

But IT folks need to get tougher — and not just with vendors. Sit down with executives in your company and discuss the plague of file attachments that has afflicted us all.

If it were up to me, I'd ban all attachments that could conceivably cause damage, period, if they come from outside the corporate firewall. An IT person at one company has told his users the following: "Just DON'T OPEN ANY ATTACHMENT! EVEN IF IT IS FROM SOMEONE YOU KNOW. Call or e-mail the sender and say, 'Did you send me this document?' If they confirm it, then it's probably OK to open. If they say, 'What attachment?' delete that sucker!"

Attachments are a pain for more reasons than

maintaining security, by the way. They consume bandwidth, and mobile computer users who aren't attaching to LDAP-equipped mail servers absolutely loathe them. Until I changed e-mail clients to a product that allowed me to refuse attachments of more than a certain size, I frequently found myself wasting outrageous amounts of time downloading unwanted and universally pointless attachments in order to get to the mail I really needed.

I've had a personal rule for some time when dealing with public relations people, who are unaccountably fond of sending attachments. I just say "No thanks. Please send plain text only."

Get users back into the plain-text habit. You'll do your company a favor. ◗

ALLAN E. ALTER

Trends that never died: TQM and re-engineering

FELLOW *Computerworld* columnist Jim Champy recently wrote, "The New Economy won't work without re-engineering" — e-commerce companies must re-engineer their processes to survive [Business Opinion, April 24]. Jim's got it right, and if this seems odd to readers who believe that re-engineering is dead, it shouldn't. Re-engineering has never really been dead. Neither has the total quality management (TQM) movement or its Six Sigma variant — witness the devotion that GE's Jack Welch lavishes on it. The fact is that once-hot management practices don't die when they stop drawing media attention. Nor should they, for it's after the attention goes away that good ideas are most useful.

ALLAN E. ALTER, a former *Computerworld* editor, is editor in chief of MIT's *Sloan Management Review*. Contact him at **alter@mit.edu**.

I'll be the first to agree that re-engineering and TQM are difficult to implement and that many companies that tried them failed. Re-engineering was tarnished by managers who abused it as an excuse for mass layoffs. TQM fell into disrepute partly because of the zealotry of its advocates. But tarnished or abused, in fashion or out of fashion, each concept still has its place.

Management ideas are as susceptible to fashion as hairstyles and eyeglasses are. How many times have we seen the following cycle go 360?

Birth: A consultant or professor presents a Big New Idea in a book or an academic management review. If the idea sounds reasonable, promises major benefits and is in sync with the times (re-engineering — a way to do more for less money — was born during a recession; TQM arose when the Japanese were eating our lunch), it has a shot at surviving to the . . .

. . . **Early-adopter phase:** The Big New Idea gets noticed by the major consulting firms and vendors, if they can build a big practice or sell a lot of technology to implement it. Consultants tout it in more articles and books and persaude a few leading-edge clients to adopt it. That's the start of the . . .

. . . **Buzz phase.** Reporters and researchers start writing up the idea as the next hot trend. More companies adopt it, providing the fuel for more articles and reports. Wall Street notices and starts rewarding vendors that are seen as market leaders. Other companies notice and start claiming that they're doing it, too (whether they are or not). From this point on, it's all downhill. Next comes . . .

. . . **The start of the slide.** Most of the early and not-so-early adopters fail. The press begins to question whether the idea really works. As more failures are reported, the Big New Idea enters . . .

. . . **Free fall.** The media focus on failures; columnists pronounce the Big New Idea passé. Conference speakers begin to criticize it. The trend competes for attention against a new trend just starting its own cycle. Finally, the idea drops from sight and comes to be considered a failure.

But is the Big New Idea really a total failure? What's forgotten when the hubbub dies down is that these ideas have their successes as well as their failures. People are still doing them. Unfortunately, the media and the consultants aren't much interested in the successes anymore — they've moved on to something new. And that's a shame, because there's now far more information and hard data about how to do it right, since the failures have been picked apart and the lessons have been learned.

Instead of being dead, re-engineering is now part of the management repertoire — a technique to be pulled out and used when the situation calls for it. And given the challenges facing e-commerce, I say the time is right for some re-engineering — and TQM, too. ◗

READERS' LETTERS

Readers' solutions to the labor shortage

I FIND IT IRONIC that on the front page of the May 15 issue, companies complain about the lack of IT employees and say they want to import more talent via H-1B visas ["H-1B Visas Gone; Few Options Left"]. Then, on page 52, there is a wonderful story titled "End of Job Loyalty?" detailing why IT employees are unhappy and leave their present jobs.

Perhaps if the companies complaining on the front page would read and act upon the items mentioned on page 52, they wouldn't need to import employees. If they were to start addressing the complaints, maybe more American college students would enter the IT field and end this so-called shortage.

Chuck Kreiter
MVS systems programmer
Columbus, Ohio

RATHER THAN reprinting the press releases generated by the Information Technology Association of America, and the advocacy research it funds, look at the shrinking number of help-wanted ads and, more important, the precipitously declining salaries for all levels of programmers, network analysts, etc.

We are in the midst of a profound slowdown in jobs and wage growth. Smirky Gen-X anecdotes to the contrary, it's the job market that is tight, not the labor market. How else to explain the gauntlet of interviews one must undergo in order to land an even basic job in technology? How else to explain the great reluctance of any employer to even meet with a candidate unless he precisely matches every single skill on the company's job requirement?

Those characteristics are definite hallmarks of a tight job market, not a tight labor market. H-1B visas were never about solving a labor shortage; they were about driving down salaries to the point where programmers were as cheap and replaceable as coffee baristas.

Bob Makarowski
New York

ONE OF MY goals when I founded my company was to facilitate the evolution of new IT workers by identifying, hiring and training people who have the capacity for learning technology concepts.

As with other companies, we seek people who already possess prized IT skills. However, I feel it is important that we don't overlook the fact that there are a lot of intelligent people in this country who possess the ability to learn IT skills if they are offered the opportunity.

While overseas talent provides a Band-Aid solution, I believe our approach is more farsighted.

Brian Richardson
President and CEO
Highlander Technologies Inc.
Titusville, Fla.

How to get rid of those old computers

IN RESPONSE to the story "Millions of Obsolete PCs Enter Waste Stream" [News, April 10], please inform your readers that there are at least three organizations devoted to channeling old computer equipment to the less fortunate:

National Cristina Foundation
Stamford, Conn.
www.cristina.org
ncf@cristina.org

East West Foundation
Roxbury, Mass.
www.eastwest.org
ewf@eastwest.org

Computer Recycling Corp.
Mountain View, Calif.
www.crc.org
info@crc.org

Alejandro Nunez
New York
Alex.Nunez@
MutualofAmerica.com

Editor's note: *A fourth organization, as noted by another letter writer, is Cyber Seconds in Red Bank, Tenn.*

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

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GEOFFREY JAMES

IT managers can learn from *Tao of Programming*

IN THE 15 YEARS since I "translated" *The Tao of Programming* (InfoBooks), it's become one of the most widely quoted books on programming, especially on the Web, where hundreds of bootleg copies are floating around.

The book's premise was that great programmers are actually Zen masters: A novice asked the master:

"Here is a programmer who never designs, documents or tests his programs. Yet all who know him consider him one of the best programmers in the world. Why is this?"

GEOFFREY JAMES is the author of numerous books and feature articles. Contact him at **www.geoffreyjames.com.**

The master replied: "That programmer has mastered the Tao; he has gone beyond the need for design. He does not become angry when the system crashes, but accepts the universe without concern. He has gone beyond the need for documentation; he no longer cares if anyone sees his code. He has gone beyond the need for testing; each of his programs are perfect within themselves, serene and elegant, their purpose self-evident. Truly, he has entered the mystery of the Tao."

— From *The Tao of Programming*

While the idea was tongue-in-cheek, it's definitely true that programming is more of an art than a science. Programmers may not be Zen masters, but most of them are artists, and like artists, they love to exercise their skills. If not given an interesting assignment, most programmers will merrily code a computer game.

There's a downside to that artistic temperament, though. Programmers like to argue with one another, and it can be difficult to get them to cooperate.

A manager went to the master programmer and showed him the requirements for a new application. The manager asked the master, "How long will it take to design this system if I assign five programmers to it?"

"It will take one year," said the master promptly.

"But we need this system immediately or even sooner! How long will it take if I assign ten programmers to it?"

The master programmer frowned. "In that case it will take two years."

— From *The Tao of Programming*

Successful IT managers understand and learn to work with the artistic side of their employees. The IT manager needs to be what used to be called an "impresario," a person who, through force of character, melds creative energies into a great work of art.

Few things are more pitiful than an IT manager who thinks programming is simply a science. I once saw a company spend $2 million to create a programming "methodology" whose sole purpose was to remove creativity from the process. It was a miserable failure because it drove away the really talented coders, most of whom preferred to work in a less structured environment. I guess what it comes down to is letting programmers do what they do best. Or, put another way:

When managers hold endless meetings, the programmers write games.

When accountants talk of quarterly profits, the development budget is about to be cut.

When senior scientists talk blue sky, the clouds are about to roll in.

Truly, this is not the Tao of Programming.

When managers make commitments, game programs are ignored.

When accountants make long-range plans, harmony and order are about to be restored.

When senior scientists address the problem at hand, then the problem will soon be solved.

Truly, this is the Tao of Programming. ◗

JOHN GANTZ

Complementary skills needed for Web success

WE'RE HAVING WEB WARS in my kids' high school! Each class has its own unofficial Web site, each claiming to be better than the others. The senior class site even has a password-protected area — the better to schedule weekend parties — but the juniors have already broken the code. The freshmen have the best graphics and Java applets, but the content is weak. (You'd expect that from freshmen.)

JOHN GANTZ is a senior vice president at International Data Corp. in Framingham, Mass. Contact him at **jgantz@idc.com.**

Quick polls allow visitors to rate the sites.

The curious thing about these sites — and the preface to this lesson — is that each has a strong personality behind the content and very existence of the site and each has a strong technical type in the background making the site work.

At the best site, that of the seniors, the two characters behind it — Adam and Joel — have known each other for 12 years and somehow act as a seamless entity when it comes to driving the site. Adam has the brand (and URL), but Joel has star-quality skills. So they share the limelight.

You can learn a lot from Adam and Joel, because I find the type of dynamic at work at some of the biggest and best Web sites. The collaboration between IT and the marketing or product team behind the site is seamless. Each side takes pride in the other's contributions.

This isn't as easy as it looks. The "dynamic tension," to use a euphemism, between IT and the business unit is often thick enough to cut with a knife. But I believe it's a secret ingredient to any great Web site — or to any great enterprise application, for that matter.

I also believe that behind this tension is not a conflict of business goals or intentions, but one of personalities. The personality types that gravitate to marketing or business management positions are different from those that gravitate to technical professions. Adam is the jock, Joel the musician.

I have confirmation for this stereotype. In a recent white paper I helped write for one of *Computerworld*'s sister publications, *The Industry Standard*, International Data Corp. conducted a survey of 1,000 Internet executives in the U.S. and Europe and got them to rate their personalities on a number of bipolar attributes. For example, we asked whether they were aggressive or passive, risk-averse or adventurous.

Guess what? Even taking out the answers from executives at dot-com companies and sticking with those from brick-and-mortar respondents left us with a pretty wild and crazy bunch. They scored above 60% on risk taking, aggressiveness and early adoption and above 90% on optimism and fascination with technology.

The control group of IT executives for this study was much smaller, but early last year, IDC asked IT professionals a subset of these questions and got a much different picture — 80% came out as risk averse, 60% were pessimists and two-thirds were late adopters.

I don't know where you fit on this personality grid, but there are all sorts of implications here for you and your companies. World-class technology implementations need both personality types: someone to cook up the impossible idea and raise money and someone to point out that it's impossible and then do it anyway. With all business becoming e-business, both camps will be tethered more often. Your company's e-business success will rely on making this forced marriage work. Your career success will require knowing where you fit in and how to adapt your personality to this new arrangement.

And trust me: It's going to take a lot more than a good service-level agreement between IT and the business unit — and more than good project management systems — to make e-business work. It will take day-to-day, minute-to-minute commitment and adjustment. You'll have to feel you know each other as well as Adam and Joel do. ◗

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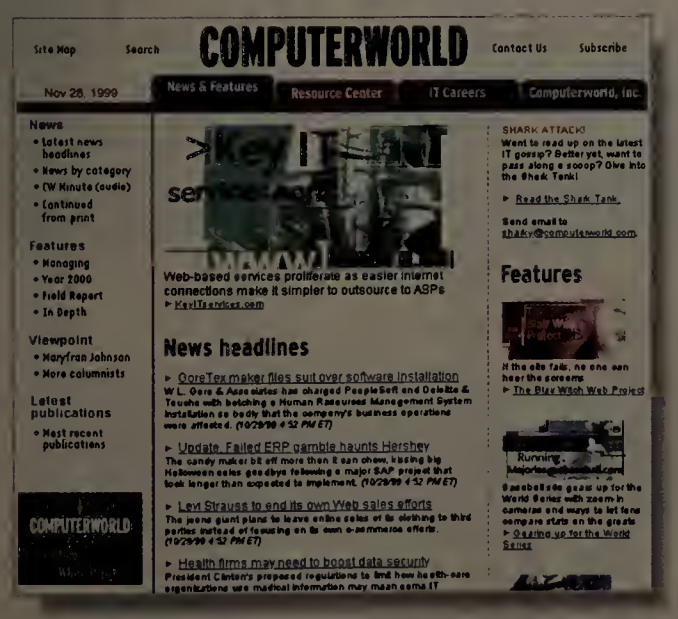

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BUSINESS

BLUE LIGHT INVESTMENT

Kmart has been struggling against its heavyweight rivals, Wal-Mart and Target, for years. But the company is hoping things will turn around with a $328 million investment aimed at upgrading its technology infrastructure and boosting its e-commerce presence. ▸ 42

TAMING THE WEB

It's time for the government to step in and investigate some of the online business-to-business exchanges that are popping up, writes Kevin Fogarty. Until now, Internet players have been free to run wild. But without some rules to ensure consumer privacy and to protect against monopolistic activity, he says, the Web will lose its appeal. ▸ 42

ARE NASDAQ FEE CUTS ILL-TIMED?

Nasdaq is putting the call out for more customers with its recent plans to lower the fees for its stock-quote services by as much as 80%. But critics say the cuts come at a bad time, as Nasdaq struggles to fund its technology upgrades and shift from fraction-based to decimal-based pricing. ▸ 44

LANGUAGE LESSONS

Terra Network's planned takeover of Lycos is just one of many recent corporate moves aimed at serving Spanish-speaking people. Jupiter Communications predicts the number of Latin Americans using the Web will climb from 9 million to 39 million by 2003. ▸ 45

LIFE AT CORNING

When you think of Corning, does Pyrex and Corningware pop into your head? Well, in recent years, the company has been far more focused on laying the infrastructure for the Internet. What's it like to work in the IT department at this small-town company? ▸ 48

CYBERLAWYER SHORTAGE

As e-commerce continues to explode, companies are stumbling across a major gap in cyberspace. It seems there aren't enough lawyers with expertise in the ways of the Internet to advise IT managers on thorny legal issues. ▸ 52

MOURNING LOST SYSTEMS

Depression, denial and anger are classic signs of grief. They're commonly felt by those mourning the loss of a loved one — a loved system, that is. One irate group of employees went so far as to throw a 100-pound sack of flour at a project manager implementing a new system. So, how should companies help staff cope? Carefully and gently. ▸ 50

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BERND AUERS

MORE THAN PRETTY FACES: Ibeauty.com's Frank Stolze, Robert Lee, Rick Cecil, James Turner and Gregory Cranz are part of the IT team that turned the online retailer around

E-COMMERCE MAKEOVER

A YEAR AGO, Ibeauty.com was in dire need of a new look. The IT group at the New York-based online cosmetics company wasn't a pretty sight. But these days, the company is sporting an all-new look, with a full-blown IT operation. Here's how Ibeauty.com got itself back in shape.

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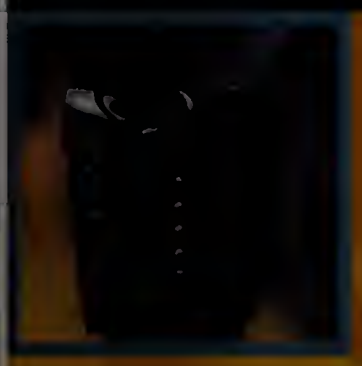

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Kmart Belatedly Ready to Make Online Play

Analyst questions whether big investment in technology will make difference

BY MICHAEL MEEHAN

Kmart Corp. has decided to invest big bucks to push its bluelight specials.

The Troy, Mich.-based retailer plans to launch an online operation called Bluelight.com next month. It also announced last week that it will make an additional $328 million investment in technology to boost its brick-and-mortar facilities.

At the company's annual meeting last week, President and CEO Floyd Hall said Kmart plans to build its online presence over the next year, with a goal of offering a wider selection of goods online than at any single existing store. Kmart now offers only a limited selection of merchandise online.

Hall added that the company hopes to make an initial public offering for Bluelight.com next year.

Analysts said Kmart is cutting back on the number of stores it opens, which leaves the company with more cash to invest in technology.

Brian Eisenbarth, an analyst at Larkspur, Calif.-based Collins & Co., said the chain has been fighting "a reputation for being less than top-quality" for years. He said the online move might signify an attempt by Kmart to reinvent itself.

"Online really has been a minimal effort on their part until now," he said.

The retail chain had done well in closing old stores and improving its product line, Eisenbarth added, but the stock market perception has yet to reflect those changes.

"Obviously, the market's not convinced the turnaround's in place; otherwise, they wouldn't be trading at $7 a share," Eisenbarth said.

Eisenbarth pointed out that Kmart's stock is suffering, compared with that of Bentonville, Ark.-based Wal-Mart Stores Inc. and Minneapolis-based Target Corp. Early last week, when Kmart was at $7, Wal-Mart's stock was selling at $57 per share, while Target's was at $67 per share. Kmart's stock was trading at 6.5 times its earnings, while Wal-Mart's was at 38 times and Target's was at 23 times earnings, Eisenbarth noted.

That lag has followed Kmart into the e-commerce realm, where Wal-Mart and Target already boast full-service online operations.

"Kmart really doesn't have the resources Wal-Mart and Target do, and I'm not sure they should try to compete on every level," Eisenbarth said.

FLOYD HALL, Kmart's CEO, says the chain has yet to reach its potential

Missing in Action

In an April study of the top business-to-consumer sites conducted by ActivMedia Research LLC in Peterborough, N.H., Kmart didn't even make the list of notables, despite its standing as the third-leading retailer in the nation.

"Some companies have been slow to move, and that's what we're finding with our study," said Harry Wolhandler, ActivMedia's vice president of research.

Meanwhile, Kmart plans to invest $328 million in technology to improve customer service within its stores — an increase from $131 million last year and $132 million in 1998. The money will be used to install new high-speed checkout scanners and modernized registers at Kmart's highest-volume stores.

Hall, who plans to retire next April, said the chain "is not yet the retailer we all want it to be."

Technology appears to be a big part of the effort to run with the big dogs of the retail trade.

"I'm not sure Kmart's going to convince people they're a high-tech company," Eisenbarth said. "I think their money is better spent on partnering with Martha Stewart and improving the products in their stores."

Retail Woes

Wall Street's assessment of Kmart's performance vs. competitors' is reflected in price/earnings ratios as of early last week:

KMART	WAL-MART	TARGET
6.5	38	23

KEVIN FOGARTY/BRICKS AND CLICKS

The OPEC of meat

IT'S ALREADY HARD to convert a brick-and-mortar company to a bricks-and-clicks hybrid, and the government is trying to make it even harder. And you know what? I hope it succeeds.

For instance, last week the online ticket service that the major airlines are putting together became the target of investigations by the Justice Department and the Senate, and it's not even supposed to launch until sometime this summer.

People at the DOJ and Senate are worried the new business model will be anticompetitive because it cuts travel agents out of the loop.

The FTC and the DOJ are also running informal antitrust investigations of business-to-business exchanges under development by the Big Three automakers. A Ford spokesperson said the three have slowed development of the project until the investigation is complete.

The FTC is also pushing for more stringent privacy regulations, which would not only restrict how data on Web customers is handled, but would also impose rules that make handling the data more complex and impose penalties for even accidental violations.

And in Minnesota, a state representative is trying to get U.S. uber-antitrust warrior Joel Klein to take time off from the Microsoft case to investigate a food processing exchange he calls "the OPEC of meat" — a cartel of six of the largest food-processing companies — that the rep believes will cheat farmers. (Although, to tell the truth, "OPEC of meat" has become my favorite phrase. I'm thinking of having T-shirts made up.) You can't launch a cartel anymore without drawing fire.

And that's great. The Internet has a reputation of being the Wild West — untamed and untamable. The problem is that outlaws are the only people who want to live in a place where there are no laws.

But most of the players are hardly monopolistic predators. (I mean, come on — Ford?) They're just operating in an area in which normal standards of behavior have not yet been defined.

KEVIN FOGARTY is *Computerworld*'s business editor. Contact him at kevin_fogarty@computerworld.com.

You can't do much business without definite rules, even if you're starting out as the one in a monopoly position. Because if you can take advantage of suppliers in one context, buyers will be able to do the same to you in another.

And if there are no rules about privacy, any trust that you believe your customers have in you is complete fiction. A relationship in which one party promises not to take advantage, but has the power to do so, isn't a healthy one.

An FTC survey found that only 42% of the top 100 e-commerce sites even made such a promise — never mind kept it. People don't like to be in that kind of relationship with vendors. They rebel.

There has to be a balance of power between buyer and seller — and enforceable rules of behavior are the only way to make sure that happens.

That means limits on what you can do with customer data, limits on what kinds of information you can share with competitors about the suppliers you work with, limits on whom you can exclude from an exchange, and why — the same limits you deal with in the real world. The same ones that protect small competitors from large ones, and protect consumers from dangerous products or price-gouging vendors. These investigations will lay down the groundwork for laws that make sense for business online.

It was always a fantasy that dot-coms could build a huge market and make money by losing money. And it's a fantasy that B-to-B exchanges can create huge advantages with behavior that's shady or patently illegal in the off-line world.

Both are possible for a while, but eventually the laws of the market or the laws of the land are going to pop that bubble.

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Nasdaq Cuts Fees to Compete on Internet

BY MARIA TROMBLY

Nasdaq has been working to lure new customers by cutting the fees for its services as much as 80%. But according to critics, the price cuts are poorly timed and bad for the exchange's bottom line.

Last month, New York-based Nasdaq Stock Market Inc. announced that it will cut the prices for its bare-bones stock quote service from $2 to $1 per month for individual investors.

Then, last Monday, the exchange said it will reduce its midlevel market information service, which offers stock quotes and deep real-time market information, by 80% — from $50 to $10 per month.

"We want to be the lowest-cost provider of trades and information, and this is consistent with that," said Nasdaq spokesman Scott Peterson. "We have been lowering costs on items across the board."

The lower fees are aimed at helping the exchange better compete in the Internet age, said Peterson. But, he insisted, they have nothing to do with pressure from electronic communication networks.

"As markets evolve and the Internet becomes more prevalent, costs are being forced lower," he said.

Upgrade May Suffer

Nasdaq critic Alan Davidson, president of Zeus Securities Inc. in Long Island, N.Y., and head of the Independent Broker-Dealer Association, said Nasdaq is already facing other problems, such as implementing a new decimal-based pricing system.

Cutting prices, he said, will leave the exchange with less money to pay for the much-needed and much-delayed upgrade.

"The failure of Nasdaq to come up with a comprehensive program where all members can have access to 24-hour trading is also very distressing," Davidson added.

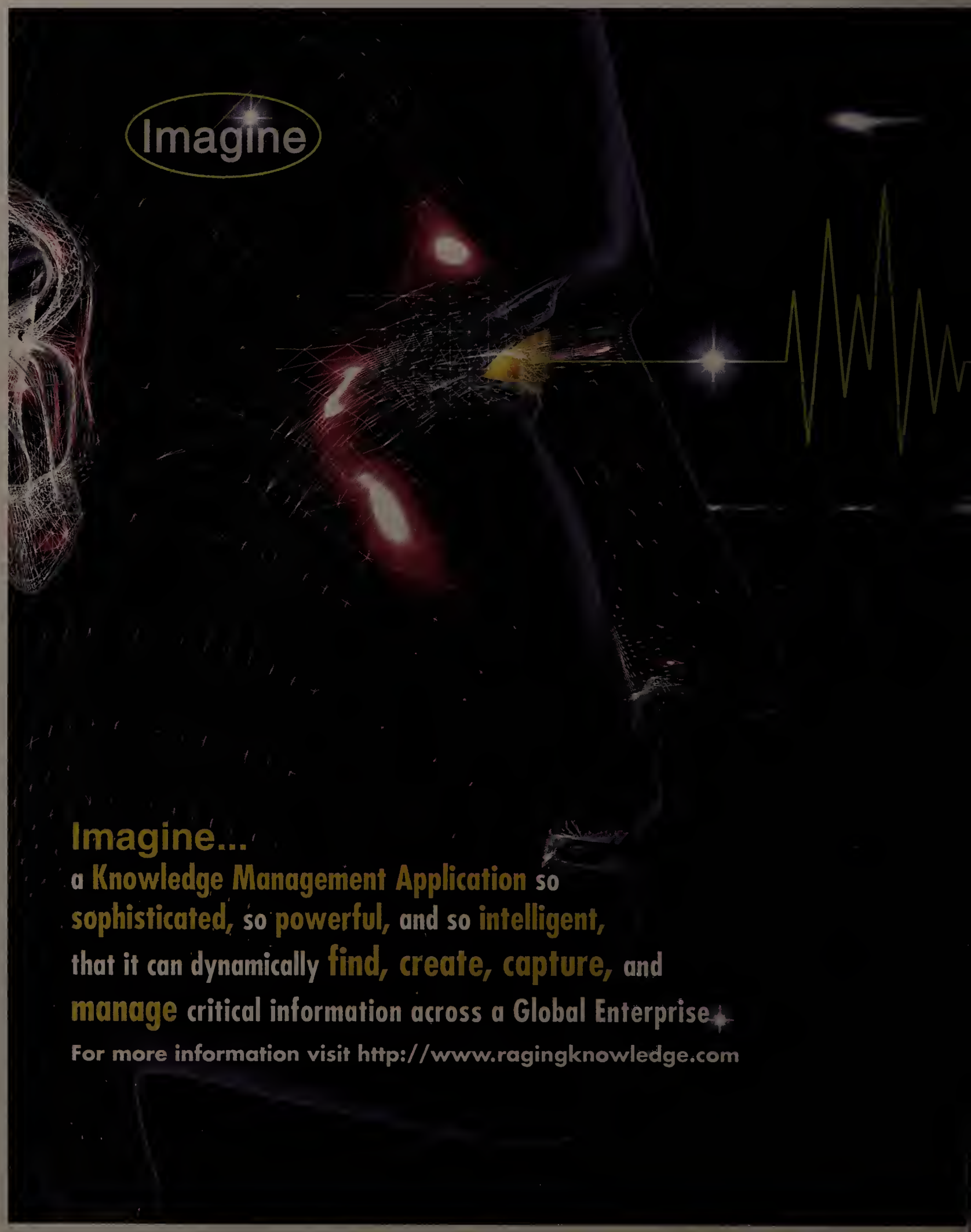
But Peterson said the price cut will be revenue-neutral, with the lower costs being offset by higher volumes.

Only a third of Nasdaq's income comes from selling market data; the rest is made by trading and listing fees.

"It's an important part of their revenue stream, but I don't think the fee cut will be a huge problem," said Lawrence Scinto, a consultant specializing in financial services at Menlo Park, Calif.-based SRI Consulting.

While the price cut still needs approval from the U.S. Securities and Exchange Commission before taking effect, some brokerages — beneficiaries of the price cut since Nasdaq doesn't sell its data directly to the public — are already planning to pass the savings on to their customers.

"It will certainly help our clients access the market," said Kerry Dukes, president of New York-based online brokerage Trade.com.

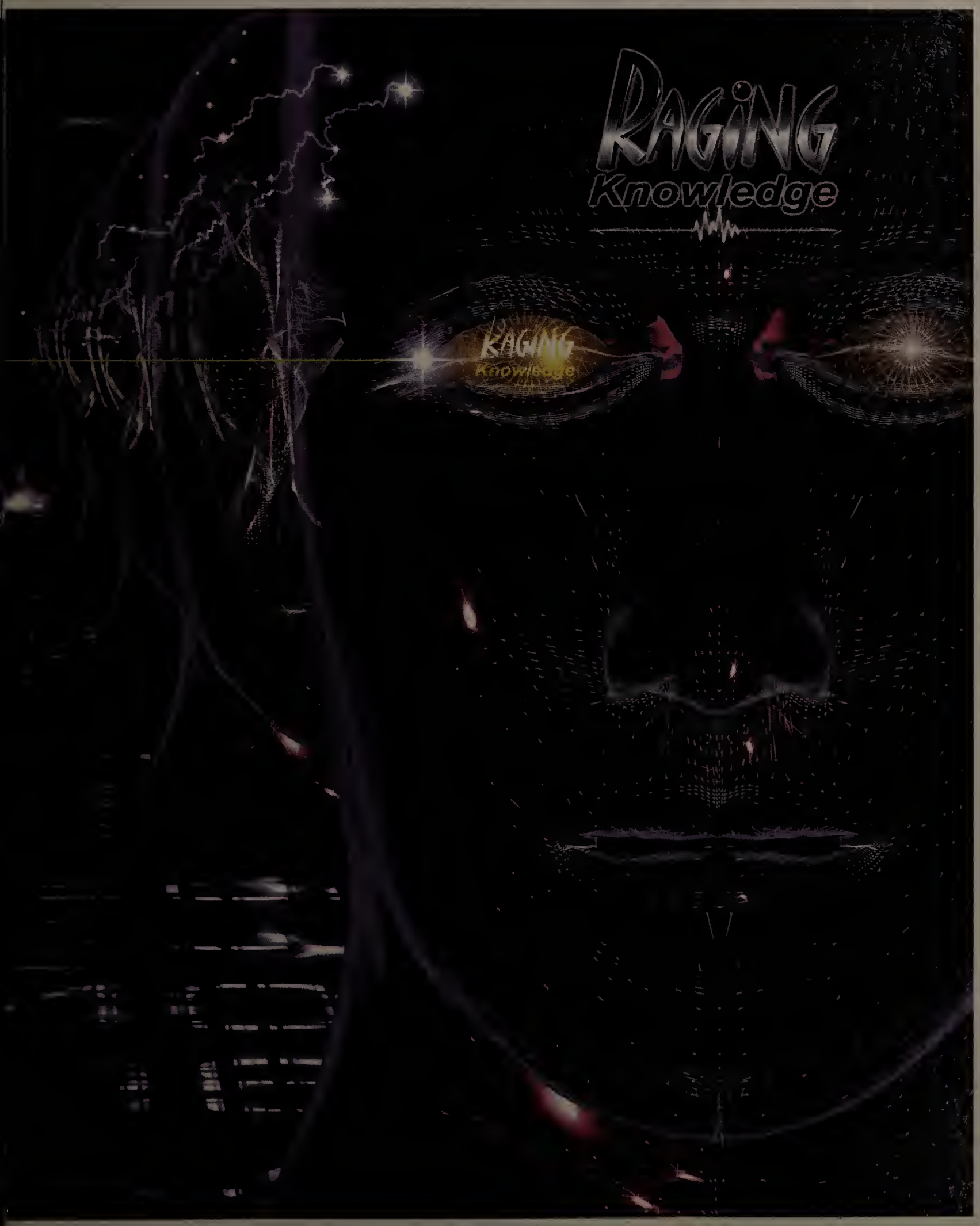


U.S., Latin America Blending E-Commerce

BY JENNIFER DISABATINO

Spanish Internet portal Terra Networks SA's planned takeover of Lycos Inc. in Waltham, Mass., was unusual in that it involved an old-line European company buying a U.S. dot-com. But it also marked the growing importance of Spanish-speaking markets on the Web.

In recent months, a host of U.S. electronic businesses have launched Spanish-language sites or merged with companies with existing Spanish-language content to broaden their customer bases, which will increasingly be Spanish-speaking. A recent report by New York-based Jupiter Communications Inc. predicts that the number of Internet users in Latin America (now approximately 2% of all Internet users) will grow from 9 million today to 38 million in 2003.



Terra and Lycos officials said they expect to reach 50 million users in 37 countries. Lycos is the fourth-largest portal in the U.S. and is a portal in 25 countries, through 65 sites in 13 languages.

Because of Latin America's proximity to the U.S. and the large Spanish-speaking U.S. population, Spanish speakers are the target of a lot of U.S. firms, especially those run by U.S. Latinos, said Barry Parr, an analyst at International Data Corp. (IDC) in Framingham, Mass. IDC expects Latin America to account for $8 billion of the worldwide e-commerce market in 2003 and Asia to account for $51 billion.

Consejero.com, a Spanish-language financial information source in Miami, announced an alliance last month with Atlanta-based DotPlanet.com to provide cross-content for Spanish speakers inside and outside the U.S.

This isn't just a case of U.S. dollars flowing into foreign companies. American companies are also benefiting from an increase in e-commerce with their southern neighbors.

Leading Mexican Internet portal Mexico.com announced last week it will sign on with KnowToday Inc. in Cincinnati for information services on its Web site. KnowToday has an open forum where people post questions and experts auction off answers.

"In essence, we enable them to offer their regional users an information and research exchange under the Mexico.com brand, in Spanish, running off their main page," KnowToday spokesman George Luntz said.

In February, e-Companies Venture Group LP in Santa Monica, Calif., provided first-round funding for Mexico.com.

Telecommunications firms in the U.S. are also moving in on the wireless market in Latin America. In February, AT&T Corp. announced the acquisition of the newly formed Argentine local exchange carrier Keytech LD, which will allow access to Internet and wireless services in Argentina's nine largest cities.

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[TALK TO THE COMPANY THAT INVENTED THE RAKE.]

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WORKSTYLES

What It's Like to Work at . . . Corning Inc.

Interviewee: Greg Dilorio, information technology business manager of the telecommunications products division, which makes the glass for fiber-optic products used to create fiber-optic cables
Company: Corning Inc.
Main location: Corning, N.Y.
Is Corning a company town? "We were at one point. It was more of a factory, blue-collar town, but that has changed 180 degrees to more of a professional town. We actually have more Ph.D.s per capita than Silicon Valley.

"Corning is always reinventing itself. We just announced a new branding strategy that reflects the fact that all of our businesses are in high-tech, fast-growth sectors. And part of our changing image is shedding the 'company-town' designation."
What's the company's best-kept secret? "Corning has been as integral in laying the infrastructure for the Internet as the Ciscos of the world. So now we're emphasizing that we are a major player in the Internet space. Wall Street knows it, but the general public does not."
Number of IT employees: 1,000 companywide
Number of employees (end users): About 30,000
Career path: Started as a telecommunications analyst; named to lead a corporate messaging initiative in 1996; led an Internet infrastructure development project and deployed a remote-access strategy and infrastructure; and moved into current position last July.
Is such a path typical? Yes. "Within Corning IT there's tremendous opportunity to move around, learn new skills and work in various divisions."
Dress code: Business casual
Workday: "The workday isn't bracketed just by the hours you put in at the office. We . . . were one of the first towns in the country to get cable modems . . . that allow people to work from home. So I usually do e-mail from about 5:30 to 7 a.m. and get to the office about 7:30 a.m. I leave at about 5:30 p.m., coach baseball, put the kids to bed and then log in again at 9 or 10 p.m."
Must people carry beepers? **Cell phones?** "Oh, yeah. Everybody in IT gets a beeper – it's standard issue. We're always on call formally or informally."
Must you travel? Yes. "It comes in peaks and troughs. I may not travel for a couple of months, and then I'll be gone two or three times in a month."
Training: "We have a unique orientation program in this division . . . that orients you to every functional group in the division. . . . Technical training will include database, e-applications, Web-based applications development, and now . . . there may be some [enterprise resource planning] training."
Employee reviews: "Formally, it's once a year. Informally, I ask my folks to review their objectives at least quarterly."
Bonus programs: "They're pretty lucrative. We have a companywide goal-sharing bonus that's based on a mix of meeting corporate and divisional goals. And we have formal recognition programs throughout the year, where anybody can nominate anybody else for a job well done. There are divisional cash awards and individual outstanding contributor awards that can be stock options or cash."
Do you need a security badge or card to get into the building or office? "Oh, you sure do. This is a very intensely competitive market, and security is a high concern for us."
On-site day care? Yes. "Corning helped build two day care centers. . . . The company indirectly subsidizes them to keep the costs low."
In-house cafeteria? Yes. "You can get a decent meal for two or three bucks."
Where the office gossips: (Laughs) "Oh, gosh – not in my office, I know that. They meet over at Wegman's, the local supermarket. It's the nerve center of town."
Would employees feel comfortable e-mailing the CEO? "Oh, yeah. As a matter of fact, Corning is a midsize town, and it's very family-friendly and close. So you see the vice chairman of the company in Kmart and say, 'Hey, Norm,' and he'll say, 'Hey, Greg, good to see you again.' "

– Leslie Goff

GOPAL K. KAPUR

Happier projects

THE TRADE PRESS reports another multimillion-dollar fiasco of failed systems integration, and hardly anyone notices. These projects invariably start when a business executive or sponsor receives a proposal from a systems integrator (SI) with promises of vastly improved customer service, major economic advantages and the proverbial "competitive edge."

The sponsor enters into a courtship with the SI marked by the signing of a contract with no specific performance measures.

But the sponsor/SI romance sours as it becomes evident that the SI team is ignorant of the intricacies of the sponsor's business, while the sponsor remains illiterate about the technology required to accomplish the project's objectives.

To keep the proposal attractive, the SI avoids mentioning anything that may add expense and time, such as time to learn about the sponsor's business, time for the business managers to learn about the technology and the all-important transfer of knowledge from the SI team to the host IT team. Inevitably, the project fails, and millions of dollars are wasted. Yet, if just seven simple steps had been followed, the outcome might have been very different — yes, even a happy ending.

Even the best systems integrator can't convert a half-baked idea into a successful project.

Project start: The sponsor must work with business unit managers and IT subject-matter experts to conduct due diligence and ask specific questions, such as: What are the key objectives? What are the specific measures of success? What are the implications of doing nothing? If answers aren't readily available, the project is a half-baked idea. Even the best SI can't convert a half-baked idea into a successful project.
The SI proposal: There are three simple tests to predict the outcome of an SI's proposal. First, how does the SI view the sponsor's IT? If IT isn't viewed as an ally, the project is doomed. Second, what degree of due diligence does the SI perform before submitting the proposal? If it's minimal, it may be to hide problems until after the contract is signed. Third, how well do IT and the business professionals understand the proposed solution? These people are too often overlooked in the due-diligence processes.
Project deployment: Break the project into chunks of six months or less and make sure that each chunk is Specific, Measurable and Aggressive but achievable, Relevant to the strategy and Time-bound (SMART). Also, tie all contract payments to specific milestones.
The team: Ensure that the roles and responsibilities of the sponsor and the SI's management are well-understood and documented, and that each invests sufficient time and energy. The SI proposal must include a detailed list of its project manager's experience profile — including business, technology and project management skills. The sponsor must insist on documented skill profiles of the SI team members. Finally, the SI should use a well-defined process for managing the project.
Project kickoff: Two "total immersion sessions" are needed to kick off the project. One is for the sponsor and the SI's management team. This will help familiarize the SI with the sponsor's business, and the sponsor's management with the proposed solution. A key outcome here is a list of high-risk factors. The second session is for the two project teams. The objective: Produce a list of deliverables and outline contingency plans for all high-risk factors.
Tracking the project: The sponsor's role can't be overemphasized. He must make sure that the project stays on schedule, doesn't exceed budget and meets all SMART objectives. Ideally, the project manager should meet weekly with the sponsor to report on the project's vital signs. But the meetings shouldn't include the sponsor's CIO and the SI's executives, because their presence often inhibits candor.
Project completion: The project isn't complete until there's proof that all SMART objectives have been achieved, along with the necessary transfer of knowledge from the SI to the host team.

Using these seven steps is a sure path to success for even the most difficult projects.

Kapur is president of the Center for Project Management in San Ramon, Calif. Contact him at gkapur@center4pm.com.

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MARIA RENDON

Users don't hate that new system; they just don't want to let go of the old one. Project managers who know that can help them avoid a vicious circle of grief.

By Kathleen Melymuka

WHEN A TECHNOLOGY USER at a Fortune 100 company heard about plans for a new customer relationship management system, he refused to believe it. He listed all the problems that were bound to derail the system and concluded, "This is not going to happen, so I don't have to worry about it."

As the project team began to resolve the problems, something funny happened. "Instead of saying, 'We might get through it after all,' he started getting mad," says a project manager.

Later, as it became clear that the system would soon become a reality, the user tried bargaining. He'd say, "We'll put new people on the new system and leave the old people on the old system, and that will work fine."

As the date drew closer, he withdrew and appeared to be depressed. "He just wouldn't talk about it," the manager says.

Eventually, he became a user of the new system, but his prolonged resistance was puzzling. "This is a nice guy, a smart guy," the project manager says. "But the way he was looking at this project was like dealing with grief."

That's exactly what he was dealing with, according to Nancy Johnson, assistant professor of MIS at the College of Management at Metropolitan State University in Minneapolis (johns024@tc.umn.edu). She says users facing the loss of a system go through the same stages of grief — denial, anger, bargaining, depression and acceptance — as people dealing with a death.

During 20 years she spent working in information technology at financial institutions before moving into teaching, Johnson managed her share of projects and noticed that users went through distinct stages as they detached from an old system. But it wasn't until she read *On Death and Dying* by Elisabeth Kubler-Ross that she put it all together. "They

Ma
Old

were the same stages," Johnson says. "So I thought: This is the way human beings react to change that is out of their control."

Johnson is on the money, says Deb Bushway, a psychologist who has done grief counseling and also teaches at Metropolitan State. "It makes perfect sense," she says. "Even when people *ask* for change; even *positive* changes around technology produce loss. People lose status and feelings of competence and comfort even in a positive change. The grief process is relevant."

FEELING THREATENED

Users dealing with a new system experience different kinds of loss depending on their positions in an organization and their comfort levels with technology, Bushway says. For example, a support staff employee may be the only one who knows how to access certain data in the current system. The new system may change all that. "It threatens his perceived expertise and status in the organization," she says.

A power user may realize that a platform change, while potentially positive in the long term, will slow her down initially and require relearning. "She thinks, 'I don't know anything about this new system. I feel inept, and I used to feel competent,' " Bushway says.

Those who deal with users see merit in the grief theory. "I can buy it to a certain extent," says Amy Edwards, a help desk manager at BFI, a wholly owned subsidiary of Allied Waste Inc. in Houston. "I do believe that people experience those things. But I think that, at the heart of it, grief is about change, and in a company whose culture embraces change, you will see less of that than in a company that doesn't."

Several project managers say the theory rings true, but they requested anonymity for fear of putting their users in a bad light. "You say we have a great new system, and the first response is, 'That's stupid. This thing will never work,' " the Fortune 100 project manager says. "Anger and denial just come right together."

That anger can manifest itself as aggressive behavior. For example, a group of irate users at a flour mill dropped a 100-pound sack of flour several stories toward a project manager who was installing an automated forms system. Fortunately, they missed.

When the anger subsides, the bargaining process begins. "I've had people ask me if they can still use [the old system] or if they can just use it for this one task," says an IT manager at a large New England services company.

Once depression sets in, it can be difficult to move people ahead. An IT project auditor at a large financial institution says that when groups met to talk through process changes, "people often didn't make the meetings."

Grieving users can drive project managers to distraction. "People say they are having horrible problems, and you go over [to help] and they're gone," says the services company manager. "Or you can't pin them down to a straight answer about what's wrong. Lots of times, it's not real."

Timothy Hoffman, a Spencer, Mass., family therapist and a fellow of the American College of Forensic Experts, says aversion to the new is key. "You have the denial, the bargaining, the anger, but it's neurotic; it's not a true grief," he explains. "They're mourning for security in the old system. [It's] a pain for home, for the familiar."

Once project managers realize users will feel this pain, they can smooth the transition to the new environment, Johnson says. For example, gradual changes are easier for people to assimilate, and involving users in decisions eases their feelings of loss of control.

Be sure the trainers for the new system are sensitive to users' feelings of ineptitude and that executive users aren't abetting the resistance. "If a user knows he can get some leverage by complaining about the system to the boss because he's of the same mind, that's going to happen," the services company manager says.

Johnson tells of a corporate chairman who quickly squelched resistance to a new e-mail system. "He'd send a blanket e-mail about 7 each morning, and then he'd walk around saying, 'What did you think of my e-mail?' "

Acknowledge users' pain, Johnson says, but help them see that the pain of *not* changing is greater than the pain of adapting to the new system. If a user fails to switch to the new e-mail system, for example, he will soon be left out of the loop as others send messages he can't access.

Finally, assure everyone involved that grief is a common reaction to change. "You don't have to turn it into some '60s group therapy process," Bushway says. "Just acknowledge it and expect it."

Most people are tremendously reassured after being told that their emotional process is normal, she says. "If my sense of self is rooted in my competence on the job, that competence is threatened by a change in technology on the job," she says. "That's a reasonable reaction. So the question is: How do we recognize that and maintain a sense of safety as change occurs?"

The best way is to accentuate the positive, says Hoffman: Get users to embrace the new system as an adventure. "Invite them on a journey to undiscovered lands with new equipment and new processes and the opportunity to grow," he says. "Offer them a pilgrimage to something better." ◗

THE FACE OF GRIEF

What does a grieving user look like? Nancy Johnson, assistant professor of MIS at Metropolitan State University, and several project managers have seen users demonstrate the five classic stages of grief:

Denial
- Refusing to participate in design meetings or training classes in the false hope that the new system will never be installed
- Losing documentation for the new system
- Working extra hard to make the old system seem more effective in hopes of saving it

Anger
- Providing incorrect information to throw off a project
- Refusing to send subordinates to training sessions
- Refusing to provide critical information about current processes to sabotage the new system

Bargaining
- Suggesting that other departments have a greater need for the new systems
- Suggesting running the new system in tandem with the old
- Lobbying to change priorities to kill a new system

Depression
- Increased absenteeism
- Failure to participate
- Focusing on loss of prior expertise, power or status

Acceptance
- Recognizing that the new system will result in new skills and knowledge
- Refocusing on positive activities such as training
- Acting as an advocate for the new system

urning an System

In Search of Cyberlawyers

The legal profession isn't keeping up with the e-commerce explosion, and that's adding to the IT manager's stress. By Deborah Radcliff

HARDLY A DAY GOES BY that Robert Thomas doesn't need legal advice.

"Nowadays, you can hardly blink without consulting an attorney," says Thomas, CIO at Matrix Direct Inc., a discount insurance marketer in San Diego.

That's because his company's business processes are also its main source of intellectual property, which makes application upgrades, development and rollouts legally problematic. For example, if Thomas wanted to save $100 per hour and ship some of the company's application development to India, he says he would fret because there are no guarantees that those overseas developers wouldn't sell the application to competitors.

But cyberattorneys are hard to come by, Thomas says. Even with lawyers on retainer, he often waits days — even weeks — for a return phone call. Those delays, he says, hold up production that's vital to his company's growth.

"The paradigm here is ease of access to information and data. The ease and speed of access — and the ability to easily copy and reuse someone else's intellectual property — has created an exponential increase in business," explains Larry Zanger, head of the information technology and e-commerce practice group at McBride, Baker and Coles (MBC), a law firm in Chicago.

MARTIN TRAILER

MATRIX DIRECT'S ROBERT THOMAS says cyberattorneys are hard to come by

"Intellectual property, e-business contracts and even e-business consolidation are very rich areas for lawyers because there are all types of issues people don't even think about when starting a dot-com," he continues.

Thus, the dot-com boom has created yet another labor shortage, this time in the legal community.

Legal 'Skills Gap'

Sounding like an IT recruiter, Zanger claims that his company has increased salaries, sweetened hiring packages and shortened the time needed to reach partner status in order to recruit the attorneys his firm needs.

"Because of the increase in general business created by the Internet explosion, good lawyers are in as short a supply as good IT people are," Zanger adds.

In the past three years, MBC has increased staff 10% just to keep up with clients' demands. As with dot-com start-ups, most of the new hires at MBC are twentysomethings straight out of college. But now, instead of getting paid $90,000 to $95,000 per year to research case histories, they're starting out at $140,000 and getting immediate face time with young dot-com entrepreneurs.

Suddenly, the law firm has 26-year-old attorneys cutting deals for 23-year-old dot-com entrepreneurs, adds Zanger, 53, who has practiced computer law longer than most of his new hires have been alive. "It's frightening," he jests.

Cyberattorneys work in areas of electronic business development such as business planning, funding, initial public offerings, trademark and copyright, intellectual property, business-to-business and business-to-consumer trading networks, Federal Trade Commission regulations and H-1B visa work.

When organizations like Matrix Direct involve an attorney in every major technology decision, it's easy to see how these lawyers are in such high demand. "We kick ideas around in the boardroom and when they shape up to the point we put pen to paper, we bring in the lawyers," Thomas explains.

Part of the problem in finding qualified help is that lawyers aren't trained in technology and are slow to catch on to technology concepts, says Peter Stern, chief technology officer at Datek Online, a New York online brokerage firm. "The lawyer who can understand the relationship between electronic trading and regulatory requirements is hard to come by," Stern says.

Stern says that because he hasn't found an attorney to answer such questions satisfactorily, he has become the de facto in-house expert on legal/regulatory issues and technology.

But law firms are gearing up to battle for their clients in the electronic-business liability, protection and insurance spaces.

Take, for example, the "I Love You" virus. It was the first virus to hit Thomas' organization in three years. It spread to every address on the company's mail server. The first call Thomas made was to his office to get the ball rolling on contacting the addressees, shutting down the mail server and evaluating internal damage.

"The second call I made was to our law firm in Chicago asking them to tell us what our liability will be," he says. "Their answer will be billed at $350 an hour."

Radcliff is a freelance writer in Northern California.

Today's Top Cyberlaw Issues

SOURCE: LARRY ZANGER, HEAD OF THE IT AND E-COMMERCE PRACTICE GROUP AT MCBRIDE, BAKER AND COLES IN CHICAGO

- Domain names
- Site development: copyright, patents, trade secrets and work for hire
- Privacy: information collection and use and the Children's Online Privacy Protection Act
- Contracts and transactions: trading-partner networks and digital signatures
- Security
- E-commerce liability: copyright, trademark, defamation, advertising and linking
- Current e-commerce legislation
- Traffic directors: search engines, co-branding and linking
- Taxation and jurisdiction

Glass Ceilings & Clear Solutions

In the January/February Harvard Business Review, *Debra E. Meyerson and co-author Joyce K. Fletcher propose "A Modest Manifesto for Shattering the Glass Ceiling." The message for women in information technology: Put down the battering ram and adopt a strategy of "small wins." Meyerson, who is currently a visiting professor at Stanford University's Graduate School of Business in Palo Alto, Calif., talked with senior editor* **Kathleen Melymuka** *about how IT women can identify and dismantle barriers to success.*

You say it isn't the glass ceiling, but the whole structure that's holding women back. Can you explain? The roots of gender discrimination are built into a plethora of work practices, cultural norms and images that appear unbiased, such as definitions of competence and commitment and leadership. People don't even notice them, let alone question them. But they create a subtle pattern of disadvantage that blocks all women.

But some women say there are no real gender problems in the workplace, especially in IT. Some of those patterns are so subtle that even women affected don't see them. They come up against obstacles and attribute them to their own lack of persistence, misreading of cues, not finding the right style rather than to patterns that affect women and men. We want to make people aware of these patterns so they can make choices and so women stop blaming themselves.

Can you give me an example of this invisible bias? We worked with a company [whose] culture was very entrepreneurial — like many high-tech companies. It was very informal, and people felt free to make suggestions about any area that interested them. So managers had to attend as many meetings as possible [often after hours] and work hard to protect their turf. This seems to have nothing to do with gender, but it presented a double bind for women: If [because of family responsibilities] they didn't attend the meetings and protect their turf, they lost it. If they spoke up assertively, they were called control freaks. Men acting the same way were called passionate. Same behavior, different labels.

You say that corporations talk teamwork but reward macho individualism. Can you explain? Every company has rhetoric around the importance of teamwork. But when you ask people what gets people ahead, what kinds of behaviors are rewarded, it's behaviors around being outstanding, self-promoting. The behaviors that are involved in making teams function smoothly are often around developing others and not oneself. Often it's women who do that work, [and] it's often made invisible.

How? Relationship work — developing others, making sure things run smoothly — is seen as women just being women, being nice rather than as a demonstration of skills and competencies.

JEANNE STRONGIN

WHO IS SHE?

It's not just the glass ceiling that keeps IT women from the top, it's the whole structure, and the only way to fix it is board by board. So says **Debra E. Meyerson**, professor of management at the Center for Gender in Organizations at Simmons Graduate School of Management in Boston.

Does the crisis culture in IT exacerbate these problems? Yes. Crisis mode encourages these dynamics and is perpetuated by them. Companies reward people who can be available at all times to solve crises, and that tends to be men rather than women, and it involves a certain kind of behavior that's heroic, macho. This creates a disincentive to do preventative work. It makes invisible all the work that goes into making crises not happen: anticipating problems, preventing conflict, making sure everyone has the right information.

Are there other things about the IT culture that make it more difficult for women? Anytime anyone is in a drastic minority, which is true in IT work, there's a dynamic of being a token. There is pressure to distance themselves from other women to prove they're one of the boys even though that's precisely the time they most need to work with and associate with others like themselves. Also, in any field there is a myth of meritocracy, and in IT that myth is thick. So people are more resistant to the idea that there are patterns of systemic advantage and disadvantage.

Tell me about the "small wins" approach. The idea is to identify and dismantle the subtle barriers; to change work practices deeply embedded in the organization that are so much a part of the way it does business as to be unnoticeable.

Can you give me an example? Rescheduling a late meeting would make a difference for women with child-care responsibilities. Recognizing and rewarding work that is typically invisible in the organization, like the relationship work that women do. Noticing who's present at key meetings and who's not and changing the mix so the underrepresented are brought to the forefront. Changing an interview protocol so different kinds of [candidates] are brought to the surface. These changes are small, but when they're specifically chosen as part of a larger strategy of intervention, they can accumulate to produce change.

OK. I'm a woman in IT who recognizes unintentional bias in my workplace. How can I start this ball rolling? Get together with other women, not to whine and cry victim, but to locate and understand where the problem is in a way that's professionally responsible. Take responsibility for that part of yourself that's at fault and that part that is a pattern. Then try to identify small wins — interventions to make your own work life more sound or change the environment.

Then what? Develop ways to talk about those [undervalued] activities: Mediating conflicts before they erupt. Women spend enormous amounts of time doing that, and they may not even realize they do this work. They say, "I've done nothing all day. Now I have to sit down and do my work." But the work they have been doing might have prevented a whole blow-up. Women have to develop ways to talk about these activities: "I was mediating a conflict" or "preventing a crisis." "Here's what would have been required of others had I not done that." So the first step is naming it. The second step is about negotiating how that work gets valued.

If I have a manager who isn't particularly sensitive to these issues, how can I convince him that this problem is real? It's really important to tie [the issue] to effectiveness — to what these behaviors contribute [or diminish]. You want to come at it from the point of view that work that contributes to the organization isn't noticed. Do we want people to do this work? And if so, how do we make that happen? How will people learn to do this? You need to frame it in a way it can be heard. It's very important that the relationship between the work practice and effectiveness be made very clear.

Anything else to bolster your case? Frankly, an individual acting alone has less chance of being heard than those acting together. If a group of women are together, they have a lot more power than an idiosyncratic case. But even individuals have more room than they think. ◗

> The human body is an energy system . . . which is never a complete structure; never static; is in perpetual inner self-construction and self-destruction; we destroy in order to make it new.
>
> NORMAN O. BROWN, PHILOSOPHER

IBEAUTY.COM is well past the start-up stage, but you wouldn't know it by appearances. The company operates out of a huge warehouse in New York's Chelsea district. The staff is crammed into one open space overrun by messy desks and inexpensive stainless-steel utility shelves. The only visible amenities are an overcrowded coat rack by the door and a minifridge stocked with free sodas. Paint is peeling from the walls and the exposed pipes in the ceiling.

When Chief Technology Officer Frank Stolze joined the company last September, the company's Web site was about as ramshackle as its office. "We had a broken, unstable site," he says.

All the technology was being outsourced to a partner that was growing increasingly unreliable; the partner had abandoned the proprietary platform on which it had built the site and wouldn't commit to taking care of the problems.

Stolze's mission was to bring the technology in-house and hire an information technology staff to stabilize the environment, choose a new architecture and migrate the site to a new platform. By the holiday shopping season, he had hired a core group of people. In December, the site held up as it sustained more traffic than any of its competitors, according to Media Metrix Inc., an Internet traffic-measurement company in New York.

Ibeauty.com now has a full-blown IT group of 15, with plans to expand by a third or more by the end of the year. The group is divided into the following five departments: the brains, bones, muscles, tissue and limbs of an e-commerce organization:

■ **Web engineering** – Responsible for Java programming and applications development; has six people. No further hires are planned for this year.

■ **Systems** – Responsible for infrastructure, including hardware and networking. This department has three people and expects to add one or two more by the end of the year.

■ **Database** – Responsible for creating and managing databases, customer transactions and reports. Now three people, the department will hire one more person this year.

■ **Quality assurance** – Responsible for site testing and quality assurance; responsibilities had been assigned to on-site consultants until May 1, when a quality assurance manager joined the company. The department will consist of three people by year's end.

■ **Internal IT** – Responsible for in-house infrastructure, a Windows NT 4.0 network (to be upgraded to Windows 2000 over the next few months) and desktop support. Now two people, the staff may expand substantially this year, depending on business decisions still under consideration.

The departments are connected to

MAKING UP the brains, bones, muscles, tissue and limbs (not in that particular order) of Ibeauty.com are (from left) James Turner, Robert Lee, Rick Cecil, Gregory Cranz and Frank Stolze

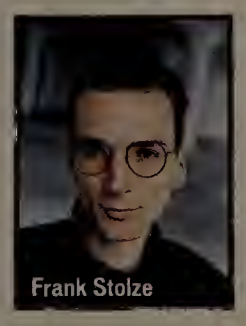
PHOTOGRAPHY BY BERND AUERS

one another, all working to keep the site running, add new functionality and migrate to the new platform. That platform, San Mateo, Calif.-based Blue Martini Software Inc.'s Customer Interaction System, is a suite of eight integrated e-commerce applications for marketing, merchandising and customer relationship management.

The staff members come from an array of backgrounds, from traditional computer science to environmental research, from physics to fine arts. The body of their skills and experience demonstrates that in e-commerce, as in anatomy, the whole is greater than the sum of its parts.

Overall IT Leader

FRANK STOLZE, CHIEF TECHNOLOGY OFFICER, 31


Frank Stolze

- **Tenure:** Since September
- **Education:** A master's in computer science from Marist College in Poughkeepsie, N.Y., 1996; undergraduate education in physics in Germany
- **Previous Experience:** Systems architect at Mail.com, an online business messaging service in New York; Java architect at Sun Microsystems Inc. in New York, developing applications solutions for Wall Street firms; adjunct professor of computer science at Marist College, while working toward master of science degree
- **Job Description:** Developing and managing Ibeauty.com's internal and external technology infrastructure; evaluating and selecting technologies and vendors; hiring and managing IT staff; aligning business strategy with IT
- **Why I Got This Job:** A broad approach to problem-solving. "My work in physics has been very beneficial because it gives you an understanding of how things relate to each other."

With his team up and running, the site stabilized and the migration on its way, Stolze has turned his attention to the technology underpinnings for a business expansion. He declines to provide details except to say that Ibeauty.com will be evolving into something more than just a Web site.

"The challenge is how to stay one step ahead and anticipate potential problems we'll face six months or a year from now," Stolze says. "We have to be prepared so we're not caught in the situation we were facing a year ago."

Paying attention to the business issues is critical to individual success in e-commerce — whether you're the chief technology officer or the junior programmer, he says.

"You must understand the sector you're in — merchandising, the grand picture — not just the task you're hired for," Stolze says. "And you need to understand the interaction between your e-commerce play and the traditional retail sector, and how the retail sector will develop."

Web Engineering Department

GREGORY CRANZ, DIRECTOR OF WEB ENGINEERING, 29

Gregory Cranz

- **Tenure:** Since November
- **Education:** No formal degree. A self-described "child prodigy," he's been working with computers since he was 6 years old. His father was one of the first Apple Computer Inc. dealers on the East Coast, so Cranz gained early experience helping

Anatomy, page 56

Anatomy of an E-Commerce Organization

Ibeauty.com, an online retail site selling cosmetics, fragrances and other personal pampering products, runs lean and mean. A year ago, things got ugly. But today, with a pumped-up IT staff, the site is sitting pretty. By Leslie Goff

Anatomy of an E-Commerce Organization

Continued from page 55

customers with their computers and saw firsthand what it takes to run a business.

■ **Previous Experience:** Web development manager at MarketGuide.com, an investment information site produced by Multex.com in New York; entrepreneur providing Web site development and hosting services in New York; applications developer at CMP Media Inc. in Manhasset, N.Y.

■ **Job Description:** Overseeing all phases of site development, hands-on development work and hiring and managing development staff

■ **Why I Got This Job:** Twenty years in IT. "Raw experience and intense passion for what I do."

Cranz is a hard-core programmer. His occupation and his vocation are one and the same; he lives and breathes by IT and supports 22 networked computers in his home.

But he's also a hard-core manager, the only person at Ibeauty who wears a suit and tie — a navy, three-button affair toned down by his soft-soled shoes and his hair loosely pulled back into a ponytail. Cranz says he made a conscious decision to pursue a management track and that an in-depth technical background puts him in good standing with his staff: "I know what developers need to get their job done," he says.

"Programming is very misunderstood," he adds. "It's a creative process, and people have an inherent need to create their own thing. So, I farm pieces out as sort of black box projects. I define the inputs and outputs and let them go at it. I try to be more mentor than editor because if you encourage creativity, you get better results."

He refers to the Perl scripting language as "the Swiss Army Knife of programming" and insists on developing applications in server-side Java because "for delivering logic, it's the only model that makes sense." And he has ultrahigh standards when it comes to hiring staff, interviewing as many as 22 people for one senior Java programmer position.

"A lot of them had the title of senior programmer." he says. "But they were really junior programmers, or else they were senior programmers, but they didn't have their Java skills together."

With the built-in learning curve his staff is facing with the Blue Martini application programming interfaces, Cranz doesn't have time to wait for someone to come up to speed in Java servlets. So he has a due-diligence process: He gives candidates a Level I certification practice test and asks them to answer 30 of the 60 questions. "It's a real litmus test," he says, noting that only three of the 22 applicants passed it.

"What sets Ibeauty apart," he says, "is that we're a company based on technology. IT is the foundation on which everything else was built."

Systems Department

ROBERT LEE, VICE PRESIDENT OF SYSTEMS, 32

■ **Tenure:** Since December

■ **Education:** Bachelor of science in computer engineering from Case Western Reserve University in Cleveland, 1989; exploring whether to pursue an MBA

■ **Previous Experience:** Technical manager, designing and architecting network infrastructure for Wall Street clients at Sun Professional Services, New York; senior specialist, AT&T Corp. WorldNet, Parsippany, N.J.; advanced systems engineer, Electronic Data Systems Corp., Bedminster, N.J.

Robert Lee

■ **Job Description:** Building and maintaining the site infrastructure, including maintaining the proprietary legacy platform and migrating to the new Blue Martini platform

■ **Why I Got This Job:** In the right place at the right time. "I was with the right company because most Internet companies are using Sun equipment, and I know it inside out."

Approximately 70% of Lee's efforts are focused on the transition to the Blue Martini software. He has to devote less time to maintaining the legacy system because he has retrofitted "best practices" in network management and support to improve site stability. "We make sure that if we crash, we can recover within half an hour," he says.

Lee is a big advocate of best practices, discipline and methodology. He says he owes this to five years spent at EDS, where "they do everything by the book to make sure their customers' systems are up 24 hours a day."

"I know what works and what doesn't, and there's value in the process and the methodology because once those are set, if I'm not here, other people can follow them to fix a problem," he says.

The key to network management in e-commerce is "common sense and staying calm in a crisis," Lee says. "It's more about analyzing the situation and coming up with the right approach. Handle the pressure, don't cut corners, manage the problem. Instead of just doing things, think about it before you start."

The Tech Bone's Connected to the Business Bone

Besides IT, Ibeauty's departments include:

- **Merchandising**
- **Customer Service** (including "beauty advisers," who can make product recommendations via instant messaging)
- **Content** (responsible for site features such as "Ask Shirley," a beauty Q&A column by Shirley Lord, former beauty director at *Vogue* magazine; monthly horoscopes; and a nationwide beauty services guide)
- **Marketing**
- **Finance**
- **Production** (responsible for day-to-day site updates, seasonal releases, etc.)
- **Creative**
- **Human Resources**
- **Business Development**

Database Department

JAMES TURNER, DATABASE REPORT WRITER, 34

■ **Tenure:** Since March

■ **Education:** Bachelor of science degree in biochemistry from Virginia Tech (Virginia Polytechnic Institute and State University) in Blacksburg, Va., 1989

■ **Previous Experience:** Project manager at an environmental consulting firm in Charlottesville, Va. In his last project — an initiative with the U.S. Army group that tracks hazardous materials — he learned how to use Crystal Reports as an ad hoc reporting tool against an Oracle database

■ **Job Description:** Database reporting and data mining. Also involved in building a data warehouse based on the Blue Martini software suite

■ **Why I Got This Job:** Substantial real-world project-management experience. "I'm not wet behind the ears."

Ask Turner anything you want to know about Ibeauty's customers, and he probably knows the answer. He spends the bulk of his time generating reports on who's visiting the site, what they're doing, where they're coming from, what promotions they're responding to — "any type of site activity you can imagine," he says.

About the only things his job shares in common with his previous work are Crystal Reports and the Oracle8i database, and that's fine by him. "I always had a technical bent that I didn't exercise as much as I wanted to," he says. So when his wife was transferred to New York, Turner decided to look for an IT job, using his database experience as a foot in the door.

"Now, I'm right in the middle of something I'd just nibbled at the edges of before," Turner says. "It really is an applicant's market. Demand for talent is so strong that if you have the skills and the interest, it's a straightforward proposition."

Internal IT

RICK CECIL, DIRECTOR OF NT OPERATIONS, 31

■ **Tenure:** Since August

■ **Education:** Bachelor of fine arts in painting from Pratt Institute in Brooklyn, N.Y., 1990

■ **Previous Experience:** Systems manager for a small investment firm in New York; LAN administrator and desktop support specialist at Metropolitan Opera Club in New York

Rick Cecil

■ **Job Description:** Managing the internal LAN and network security, providing internal help-desk support, maintaining hardware and software, facilitating communication with external operations, including the site hosting service and customer service

■ **Why I Got This Job:** Problem-solving skills. He says he has the "ability to make a good decision very quickly and come up with creative solutions to problems."

The biggest difference between supporting a group of Web techies and supporting business-unit users is that you can't fudge the truth when there's a problem, Cecil says. "I can't confuse them with techno-speak," he says. "They're much more demanding and knowledgeable than your average user."

On the other hand, "they're much more forgiving when they can see that something is out of your control."

The other distinguishing factor is the demand for around-the-clock uptime. "I have to stay tidy, focused and organized," Cecil says. "You can't let problems escalate."

When he's interviewing potential job candidates, he's less concerned with specific skill sets than a willingness to confront a problem head-on. "I look for someone who can rise to the occasion whenever needed because if they have that temperament, they can quickly pick up whatever skills they need," he explains.

Where his colleagues' work touches the external customer, Cecil's job is more guts than glory. But, without IT support, the site developers couldn't do their job. "They must have access to production machines," he says. "If I'm not on top of things, their output slows down." ◗

Goff is a freelance writer in New York.

Advanced Encryption Standard

BY ANN HARRISON

FOR THE PAST THREE years, the National Institute of Standards and Technology (NIST) has been working to develop a new encryption standard to keep government information secure. The Gaithersburg, Md.-based organization is in the final stages of an open process of selecting one or more algorithms, or data-scrambling formulas, for the new Advanced Encryption Standard (AES) and plans to make a decision by late summer or early fall. The standard is slated to go into effect next year.

AES is intended to be a stronger, more efficient successor to Triple Data Encryption Standard (3DES), which replaced the aging DES, which was cracked in less than three days in July 1998.

"Until we have the AES, 3DES will still offer protection for years to come. So there is no need to immediately switch over," says Edward Roback, acting chief of the computer security division at NIST and chairman of the AES selection committee. "What AES will offer is a more efficient algorithm. ... It will be a federal standard, but it will be widely implemented in the IT community."

According to Roback, efficiency of the proposed algorithms is measured by how fast they can encrypt and decrypt information, how fast they can present an encryption key and how much information they can encrypt.

"There are actually maximum thresholds that you can get if you have high data feeds, [and] 3DES can't accommodate them," says Roback.

The AES review committee is also looking at how much space the algorithm takes up on a chip and how much memory it requires. Roback says the selection of a more efficient AES will also result in cost savings and better use of resources.

"DES was designed for hardware implementations, and we are now living in a world of much more efficient software, and we have learned an awful lot about the design of algorithms," says Roback. "When you start multiplying this with the billions of implementations done daily, the saving on overhead on the networks will be enormous."

DEFINITION

Advanced Encryption Standard is a data-encoding method being developed to secure sensitive government data. The standard will use one or more encryption algorithms selected from among five finalists: MARS, RC6, Rijndael, Serpent and Twofish. A final decision on the algorithms is due by late summer or early fall, and the standard is slated to take effect next year.

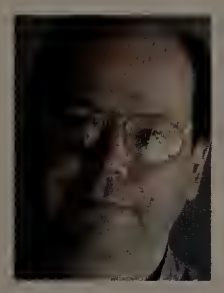
Open Process

The process of selecting the algorithm for AES has been notable for its openness and transparency. This is a marked departure from the government's past inclination toward secrecy in discussing encryption standards, which led to the public cracking of DES after critics questioned the government's assertion that the standard was still secure.

"I think [AES] is going to be very well accepted by businesses internationally," says Yair Frankel, chief scientist at Seattle-based eCash Technologies Inc. "The business community has been needing a replacement for DES for some time."

Frankel notes that when DES was developed, the cryptographic community wasn't as large or as well equipped to help conduct a public review of AES. But as a result of the public evaluation process now being conducted, he says, people will have more confidence in the new standard when it's released.

Roback agrees that the process for selecting an encryption standard has changed dramatically since 1975, when the government issued a call for DES algorithms.



"I think [AES] is going to be very well accepted by businesses internationally. The business community has been needing a replacement for DES for some time."

YAIR FRANKEL, CHIEF SCIENTIST, ECASH TECHNOLOGIES INC.

"The state of public knowledge and expertise in cryptography is now completely different," says Roback. "You have to put [algorithms] out there and let people hack at them, and if they are still standing, people gain confidence."

NIST kicked off the selection process in September 1997. Conferences were held in August 1998 and March 1999; cryptographers from around the world discussed the algorithm candidates and helped narrow the list to 15 and then to five finalists: IBM's MARS; RSA Laboratories' RC6; Joan Daemen and Vincent Rijmen's Rijndael; Ross Andersen, Eli Baham and Lars Knudsen's Serpent; and Counterpane Labs' Twofish.

"We are hoping that this will be long-lived and provide a strong security foundation for electronic commerce into the next century," says Roback. "When you look at the trillions of dollars protected by AES, this is a very important standard process, and we keep trying to encourage as widespread participation as possible."

Gaining Steam

Bruce Schneier, founder and chief technology officer of Counterpane Internet Security Inc. and a member of the team that developed the Twofish algorithm, says the NIST has done an admirable job.

"I feel confident about Twofish, but even if Twofish did not win, NIST would have done a phenomenal job, aboveboard, with no back-room deals," says Schneier. "That amazes me that that is possible, when you think about all the problems involved in encryption algorithms in this country."

Abner Germanow, an analyst at International Data Corp. in Framingham, Mass., says it's still unclear how quickly AES will be integrated into existing applications used in the private sector.

Because there's already a large installed base that uses the algorithms developed by RSA Data Security Inc. in Redwood City, Calif., new applications being built from the ground up will probably use AES on the first attempt and then switch to RSA if that isn't successful, Germanow predicts. Encryption tool kits sold by vendors typically include a large library of algorithms, he adds, and AES may become yet another choice on that list.

"People are not going to pull out existing infrastructure to adopt to this new standard, but it will be interesting to watch how quickly people see this as a requirement and how quickly developers work the standard into their applications," says Germanow.

While most evaluators of the algorithms want to avoid complexity by selecting one to serve as a standard, there's a vocal minority that wants to select more than one.

"I think there is a benefit to looking at multiple algorithms. It is not only a security issue but a performance issue," says Frankel. "Different algorithms behave differently under different environments."

Requirements for AES Specify That:

- One or more unclassified, publicly disclosed encryption algorithms will be used
- It will be available worldwide, royalty-free
- Algorithms must use symmetric-key cryptography as a block cipher
- Algorithms support minimum block sizes of 128 bits and key sizes of 128, 192 and 256 bits

Are there business terms you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.

DR. SHAHLA BUTLER | IT LEADER

VP, Director AMS Center for Advanced Technologies,
a job most of us would die for.

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IT LEADERSHIP is about using every opportunity—every technology—to reinforce your company's purpose. It's about defining business imperatives and driving the acquisition of the right technology. But the daily demands of running a company and an IT infrastructure don't always allow the time to get up to speed on the latest innovations.

As Director of the AMS Center for Advanced Technologies, Dr. Butler's mission is to increase our understanding of emerging technologies. "Ours is a commitment to keeping AMS clients on the frontier of IT practice," she says. "To address technologies that will fundamentally change the business landscape."

YOU CALL THIS WORK?

MONTHS BEFORE MOST OF US SEE THE LATEST TECHNOLOGY, DR. BUTLER GETS A PEEK AT THE REALLY INTERESTING STUFF.

For example, her team's initial XML research yielded an intelligent agent that collects relevant information across multiple sources then synthesizes, categorizes and disseminates it based on a user's specified interests. "Our Next Generation Enterprise and Business Intelligence & Knowledge Management labs are collaborating now to evaluate emerging non-numeric mining tools," she proudly reports. "We'll be releasing the results soon."

And where does Dr. Butler gain her understanding of emerging technologies? From her peers, at conferences, from the Web and from *Computerworld*. The Newspaper for IT Leaders.

COMPUTERWORLD
THE NEWSPAPER FOR IT LEADERS

JOE AUER/DRIVING THE DEAL

Customer's silence yields better deal

HERE'S A SAVVY BUSINESS practice that's not just something talked about in MBA programs: It's cheaper to keep an existing customer than it is to go out and get a new one. If you're negotiating with a supplier and stuck between a rock and a hard place, think about using this to your advantage, like one company did recently.

A customer was negotiating the extension of an outsourcing agreement. The relationship had been working well. The supplier was meeting expectations, and the customer was becoming comfortable — and dependent. Its former IT people were working for the outsourcer; the outsourcer owned all the technology assets and had become the licensee of most of the critical software.

Negotiations progressed smoothly, at first, with most terms and conditions reaffirmed for a new five-year contract, since it would be essentially the same deal. All appeared to be going very well — until pricing was addressed. It then became obvious that the supplier intended to leverage the customer's dependence into greater profit.

Specifically, the supplier wanted $3.5 million more in the new contract — a whopping 29% increase. Whoa! What happened? The supplier had decided to exploit this wonderful "partnership" for a windfall profit.

Negotiations heated up and revolved around the stunned customer's attempt to understand the supplier's requested price increase. The customer and supplier talked at great length about the cost of each service component, including hardware, software, communications, operations and support personnel, and data center infrastructure. Each component's cost was dissected and examined. Alternatives were proposed and reviewed.

The customer assertively pushed the supplier on the price of each component. The process yielded a new overall price increase proposal: only $1.4 million, a drop of $2.1 million! So when you break apart all-inclusive pricing, remember to question, analyze and negotiate each individual part, since the sum of the "optimized" parts may not add up to the original "packaged" price.

Should the customer have been happy at this point? Definitely not. It still faced a significant increase of 11.7% for the same service. Nothing had changed to warrant a price increase. Newer hardware and lower operating costs were offsetting higher labor costs. And, since this would be an extension of an existing contract, the supplier didn't have start-up costs or a learning curve to deal with.

It appeared that the supplier just wanted to maximize its margins at its "partner's" expense, for what was essentially the same job.

Having dissected the pricing, the customer took a new approach. It reminded the supplier of their long, valued relationship and that it may be cheaper for it to keep an existing customer than to find a new one. Implied in this tactic was a threat to change suppliers. Given that the $1.4 million cost increase was still on the table, changing suppliers could probably be cost-justified, but it would be a pain in the neck. At that point, the customer's representatives did the smart thing: They just shut up.

At times like this, silence is devastating to suppliers. They ask themselves: "Are they serious? Are they talking to someone else? Are we going to have to face heavy competition to keep this account?"

In this case, the supplier blinked first. Within a week, it responded with a new proposal — one that didn't include a price increase.

After careful consideration, the supplier apparently came to the conclusion that it would be cheaper to keep a valued customer than to go out and get a new one.

The lesson is that many times, successful long-term supplier relationships foster such cozy co-dependencies that it's easy to forget that the people involved work for different companies — a customer company and a supplier company, each with different sets of stockholders and both wanting maximum profits. Consequently, during negotiations or renegotiations, try to take care of whom you really work for: your company and its stockholders.

Parting shot: Here's some advice we all need to remember when we're negotiating multimillion-dollar IT deals: On the negotiations strategy keyboard, always keep one finger on the Escape key. ▸

JOE AUER is president of International Computer Negotiations Inc. (*www.dobetterdeals.com*), a Winter Park, Fla., consultancy that educates users on high-tech procurement. ICN sponsors CAUCUS: The Association of High-Tech Acquisition Professionals. Contact him at joea@dobetterdeals.com.

BRIEFS

BASF Plans Exchange

ECOutlook.com, a Houston-based e-commerce software and outsourcing company, said it has been hired by BASF Corp. to build and host an Internet-based information exchange for BASF's trading partners. Mount Olive, N.J.-based BASF is a $7.2 billion chemical manufacturer that supplies the automotive, pharmaceutical, construction, apparel and electronics industries.

Sybari Goes Global

East Northport, N.Y.-based Sybari Software Inc., a groupware antivirus and security firm, established a new international headquarters in Madrid last week and named Marc Olson vice president of international operations. Olson, formerly vice president of southern Europe for Network Associates Inc., will lead Sybari's overseas expansion.

New Service Tracks Web Customers

Encirq, an online marketing services company in San Francisco, announced the launch of a service that takes details from online reports, such as credit-card statements, to support online marketing activities. Encirq's data engine delivers targeted marketing messages that are based on an individual's online and off-line buying habits, without yielding consumer information to marketers or even to Encirq.

TriZetto Group to Buy Erisco Managed Care

Health care application service provider The TriZetto Group Inc. in Newport Beach, Calif., will purchase New York-based Erisco Managed Care Technologies, a subsidiary of IMS Health in Westport, Conn., for approximately $250 million in stock.

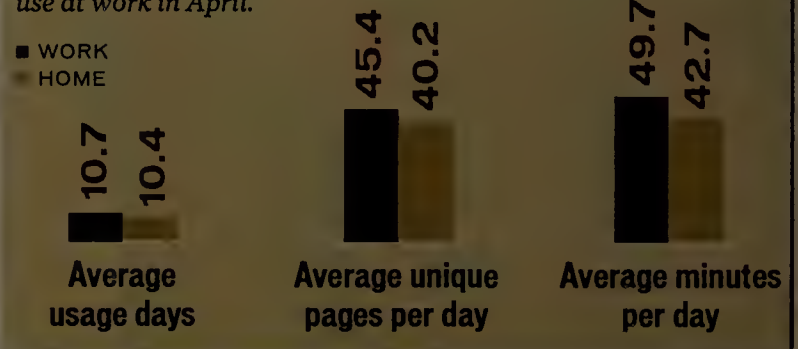
Ariba Adds Logistics

Ariba Inc. in Mountain View, Calif., said it will add integrated logistics capabilities to its business-to-business e-commerce software through an alliance with Descartes Systems Group Inc., an Internet logistics firm in Waterloo, Ontario. The companies expect to integrate their software and systems by the end of next month, giving users a single interface to thousands of transportation companies and third-party logistics providers. The link will let Ariba users compare pricing and make selections from 1,000 Descartes providers, plug in their own discount arrangements with contract shippers and track shipments.

SNAPSHOT

Browsing or Telecommuting?

U.S. Internet use at home was almost the same as Internet use at work in April.



SOURCE: MEDIAMETRIX INC., NEW YORK, MONTHLY TRAFFIC MONITOR DATA FROM APRIL

TECHNOLOGY

UTILITY GOES WIRELESS

In a move aimed at upgrading customer service, Southern Connecticut Gas recently replaced two-way radios and an old paper-tracking system with a wireless data system to dispatch its vehicle fleet for routine service calls and emergencies. The upgrade has also boosted business efficiency, company officials say. ▸ 62

SPEEDY SILICON

AS/400 users can expect not only faster performance, but also improved support for XML in a new line of IBM midrange systems announced last week. Among the new servers are the first models that use silicon to speed electrical signals to and from transistors. ▸ 62

GIMME A CHOICE

Senior reviews editor Russell Kay has tried about every portable computer and still finds it hard to find the right one. So why, he asks, does IT force us to use one kind of notebook? Wouldn't having two notebooks to choose from make users' lives easier, with minimal pain to IT? ▸ 65

ONLINE HELP

Like a doctor on call, Web sites that offer wide-ranging technical support can remotely guide you through simple fixes via Java applets, Web pages and chat windows. *Computerworld* looks at a number of such sites and discovers that they aren't as helpful as they might be. ▸ 66

QUICKSTUDY

RAID is a system of data storage that uses multiple hard-disk drives to store data. A variety of RAID storage system designs can be used to achieve different levels of redundancy, error recovery and performance. ▸ 67

FUTURE WATCH

Lasers may conjure images of medical miracles and space wars, but they're actually everywhere in modern life — like your CD player, for instance. Lasers are already the key to high-speed communications, and advances in the field could lead almost anywhere — even Mars. ▸ 68

WIRELESS ON THE WATER

Royal Caribbean Cruise Lines, which remotely manages a fleet of 17 floating hotel-casinos from shore, is betting on wireless ship-to-shore connections. Rolling out such a system is something of a risk, but CIO Thomas Murphy says the company didn't have a choice if it wanted to maintain customer satisfaction. ▸ 70

SECURITY JOURNAL

"Pat," the author of our Security Manager's Journal, is on sabbatical. The journal will return within the next several weeks.

JOHN SOARES

SIDNEY KUO, PRODUCT LINE MANAGER at NaviSite, says his firm takes security seriously: No one can enter the data center without checking in with a security guard, and only the guard and NaviSite's customers have keys to the equipment cabinets

ON THE FRONT LINES AT AN ASP

APPLICATION SERVICE PROVIDERS (ASP) are locked in heated combat for a share of their burgeoning market. *Computerworld* visited one ASP to see what it's doing to ensure its survival in the Darwinian struggle. It turns out that while innovation and cutting-edge technology are important, the keys to success may be redundancy and contingency planning. 72

Competition Sends Utility To Wireless Data System

Upgrade helps Southern Connecticut Gas answer calls and file reports faster

BY MATT HAMBLEN

SOUTHERN Connecticut Gas Co. (SCG) recently replaced two-way radios and an old paper-tracking system with a wireless data system to dispatch its vehicle fleet for routine service calls and emergencies.

SCG said the upgrade was done to improve customer service but has boosted business efficiency as well.

Since starting the installation process late last year, SCG has equipped about 70 vehicles with laptop computers and wireless modems. The goal was to eliminate lag time in contacting employees for service calls and in processing reports of visits and work done, SCG officials said.

The utility, based in Orange, Conn., serves 160,000 natural gas customers in 22 towns in the state, where competition from heating oil companies is intense, said John Charbonneau, director of marketing and customer services at SCG.

"We're in a real war with oil companies in this area," Charbonneau said.

As a result, SCG decided to boost service through quick and easy truck dispatches. But ugrading to an automated system required many technology choices, said Jeff Curley, director of customer services.

SCG chose BellSouth Wireless Data LP in Woodbridge, N.J., to provide the wireless Mobitex network, even though BellSouth wasn't the lowest bidder among four vendors, according to Charbonneau. He wouldn't name the other three or the actual bid but said BellSouth was chosen "for experience and quality," which is important for a utility open around the clock.

With a nationwide Mobitex network, SCG can expand its service territory and still use the same wireless network, Charbonneau said.

BellSouth worked quickly setting up the service and explaining technologies that were alien to utility workers, Charbonneau said.

SCG settled on installing Panasonic CF27 touch-screen laptops, which are mounted on a pedestal-style adjustable platform in the one-man vehicles. The laptops are locked inside the trucks and remain there. They were chosen over handhelds to protect against theft of the gear, Curley said.

Another choice was to use pen-based touch screens that "keep technicians from having to type," Curley said.

"You don't have to fumble with paper with a touch screen," as opposed to the old system, said Mike Urbinati, a service representative who uses the system. "It eliminates a lot of paperwork, and it's more precise."

A technician will normally log on in the morning and find a full day of work assignments. He double-clicks to open each job and gets full information, which includes the address, the type of work, the appointment time and the priority of the work. E-mails with alarm tones alert drivers to report to emergency calls. After a call, menus appear on the screen to record what parts were installed or services provided.

Charbonneau estimates that the Mobitex network covers 99.9% of the territory, but said, "We have a few quiet spots." If the wireless service fails, the utility uses two-way radios and land-line phones to call customers.

"There's no wireless network that gets 100% coverage," Charbonneau said. Urbinati said he has discovered a few dead zones in his territory but has learned to drive a few blocks to find a connection.

The company uses Advantex from MDSI Mobile Data Solutions Inc. in Richmond, British Columbia, to automate the dispatches. Advantex can help a customer service representative find a time slot when a technician can perform a service call, among other tasks.

"Before, we had to beep the technician and find him, but this system provides electronic timesheets and updates the productivity system with a push of a button in the truck," said Charbonneau.

Analysts said BellSouth is developing a reputation for setting up wireless data dispatching systems with utilities and other vertical industries because of its national network. The utilities using wireless data are usually larger than SCG, analysts said.

"It's interesting that even small utilities like Southern Connecticut Gas have to look at their operations and scrutinize as never before just to be competitive," said Ethan Cohen, an analyst at Aberdeen Group Inc. in Boston.

LAPTOPS INSTALLED in service vehicles are helping technicians at Southern Connecticut Gas receive information and answer calls

Copper, Silicon Speeding New AS/400 Server Line

Midranges get better XML support

BY JAIKUMAR VIJAYAN

AS/400 customers can expect not only faster performance, but also improved support for the content-tagging language XML in a new line of the midrange systems announced last week.

Among the new servers are several based on two technologies designed to speed chip performance: copper wiring and silicon-on-insulator (SOI) technology, which places transistors within the chip on a layer of silicon.

Since silicon transmits electricity more quickly than other materials, IBM claims that SOI can boost chip performance by more than 30% compared with older CMOS chips. SOI-based chips also consume less power and are smaller than CMOS chips.

The servers also include a dynamically partitionable 24-processor server that is nearly four times faster than current high-end models, IBM said.

Also introduced were two lower-end systems, including a dedicated server for running Lotus Domino applications like e-mail, Web serving and customer relationship management tools.

Win 2000 on AS/400s

Other enhancements to the AS/400 lineup announced last week include support for the content-tagging language XML and an enhanced PC server option that allows users to run Windows 2000 applications on an AS/400.

"They have really blown the top off their high end," said Peter Martin editor of "The 400 Group," a newsletter in Dedham, Mass.

The increased scalability at the high end, combined with support for dynamic partitioning and XML, should help users grow their AS/400 applications during the next few years, said James Garden, an analyst at Technology Business Research Inc. in Hampton, N.H.

Omnium Worldwide Inc., a collection agency in Omaha that hosts its main database on an AS/400, is evaluating Windows technologies for an emerging application that involves exchanging information with clients over the Web.

The AS/400's new support for XML means "we will go back and reconsider the platform," said Tom Ostblom, the company's CIO. The servers will be available in August.

AT A GLANCE

AS/400 Features

IBM's new line of AS/400 servers includes:

- SOI chip technology
- A high-end server supporting up to 24 processors
- Support for XML
- Two new entry servers and new dedicated servers for Domino

And I am a challenge.

I confound the Chairman,

confuse the co-worker,

and mystify all mere visitors

to the digital domain.

But some know

that with this science

comes this security

for Chairman and co-worker alike:

I put their progress first.

Does anybody put me first?

We're investing 6 billion dollars in the most far-reaching deployment of broadband out there. We're one of the largest network integrators, and a provider of advanced, global eCommerce solutions. We're SBC. The combined strengths of Ameritech, Pacific Bell, Southwestern Bell, Nevada Bell, SNET and now Sterling Commerce. You're demanding more. **Start expecting more.**℠

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BRIEFS

Voice Technology Unveiled

Copper Mountain Networks Inc. in Palo Alto, Calif., has developed new technology called Adaptive Fragmentation to improve efficiency and reduce jitter and latency in voice service over Integrated Services Digital Network, Digital Subscriber Line (DSL) and Symmetric DSL networks. The technology, which will be available in July, can increase the number of voice and data services a carrier provides over a given link, with Copper Mountain's hardware used in the carriers' networks and at customer locations. Pricing wasn't announced.

www.coppermountain.com

Alcatel Enhances Internetwork Switches

French network telecommunications equipment company Alcatel SA has announced that it will add new quality-of-service features to its OmniCore 5000 family of internetwork backbone switches.

The company said the new intelligence built into the switch core will support converged voice, video and data networks, including the capability to identify revenue-bearing traffic in electronic-business networks and accelerate that traffic at gigabit wire speeds.

www.alcatel.fr

Switching Platform Adds SAN Over IP Capabilities

Minneapolis-based Computer Network Technology Corp. has announced storage-area network (SAN) over IP capabilities for its UltraNet Open Systems Director, a switching platform for storage networks.

The platform will let companies apply data movement applications such as tape backup to existing IP connections. Computer Network Technology said the SAN over IP capabilities will be available this month.

www.cnt.com

Motorola to Launch Beeper With Keyboard

Schaumburg, Ill.-based Motorola Inc. has created TalkAbout T900, a beeper-size keyboard-equipped pager. TalkAbout T900 looks like a miniature laptop and has the ability to exchange short text messages and e-mail with any mobile phone, computer or wireless device, as long as there is an e-mail address, according to Motorola.

The new product stores up to 250 entries and retrieves news and information from the Internet, including weather and traffic conditions, stock quotes and sports scores. Scheduled for release next month, TalkAbout T900 will be priced at less than $200.

Amtrak Adopts New SpeechWorks Applications

Washington-based Amtrak, which operates passenger train service in 45 states, has announced that it will use telephony-based speech technology from SpeechWorks International Inc. in Boston.

The technology will be used to enhance Amtrak's reservations and information phone lines with speech-recognition capabilities.

By speaking into a telephone, customers will be able to receive information and answers to questions without having to use a touch-tone keypad or wait on hold, according to Amtrak.

The first phase of the SpeechWorks phone service will enable callers to speak into any telephone to receive schedule and fare information. Callers will also be able to book reservations automatically. The first phase is expected to go live in the fall.

The system will run on a platform from Dallas-based InterVoice-Brite Inc.

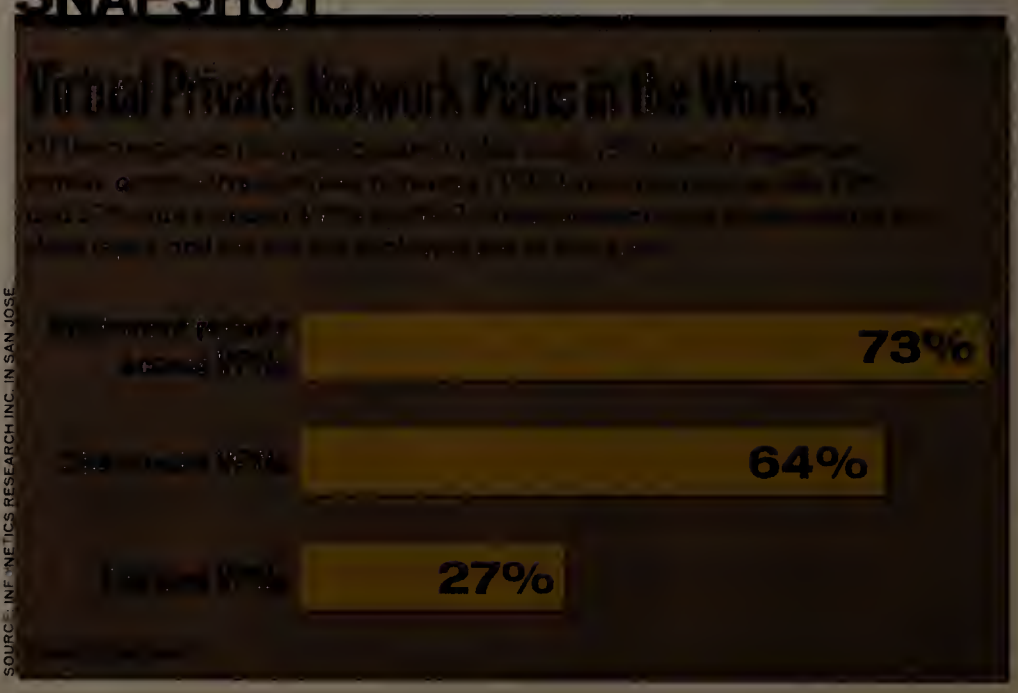
FileMaker Developer Upgrade Released

Santa Clara, Calif.-based FileMaker Inc. has released Version 5 of FileMaker Developer, which can be used for developing XML-based, royalty-free runtime Web applications that are based on the FileMaker relational database.

The suggested retail price for Version 5 is $499.

www.filemaker.com

SNAPSHOT



SOURCE: INFONETICS RESEARCH INC. IN SAN JOSE

Just a reminder
the next time you think Oracle
has the only e-commerce solution.

96% of the
Fortune e-50™
run Oracle and
96% of the same
Fortune e-50
run Microsoft®
SQL Server™.
Apparently,
the Internet
is big enough
for both of us.

Microsoft
Where do you want to go today?
microsoft.com/sql/success

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CONTENTS MAY STARTLE THOSE WITH LOWER EXPECTATIONS. USE CAUTION.

RUSSELL KAY

The Road Wearier

DURING SEVERAL RECENT TRIPS, I carried a variety of portable computers using a number of different carrying cases. And I've concluded that there's just no single good way to take a computer on the road.

And that got me to thinking: Why can't IT departments give us a choice when it comes to notebooks? Different users need different size keyboards, different size screens and different applications. Giving us even two choices seems a reasonable trade-off between chaos and one-size-fits-all standardization.

What to Carry?

On my most recent trip, I took along three very different machines. One was a Dell Computer Corp. Latitude CPi laptop with a 14-in. screen. Weighing more than 6 lb., it was a tight fit in my case, but it let me do anything I needed.

RUSSELL KAY is *Computerworld*'s senior reviews editor. Contact him at **russell_kay@computerworld.com.**

Another was a palm-size Hewlett-Packard Co. Jornada 545 Pocket PC, which costs $499. I used it to record expenses, to read an e-book and to take a few notes; no e-mail, no Web access.

The other machine was NEC Computers Inc.'s MobilePro 780, a Windows CE handheld with a nearly normal-size keyboard and a wide-format, half-height (640 by 240 pixels) 8.1-in. color display. Weighing less than 2 lb., it slipped into any small bag and went pretty much unnoticed by my shoulder. The screen is big and bright enough to use almost anywhere, and the keyboard is sized so that even my chunky fingers can touch-type. The machine costs $799.

I had hoped it could serve as a real replacement for the Dell, but I now know it won't — not yet, anyway. Using Windows CE on the handheld showed me immediately — and painfully — how inferior it is to Microsoft's Pocket PC software in terms of user interface, document handling and editing, applications and navigation. The combination of Windows CE and the low-power Vr4121 MIPS processor that makes this machine so light and versatile also prevents it from running the applications I need. And it can't run Lotus Notes, so I can't access *Computerworld* e-mail.

So I got to thinking. The MobilePro's half-height screen makes the package smaller and lighter, helping the unit fit on an airline tray table while keeping the on-screen lettering readable. Take the NEC's screen and keyboard and make the rest of the hardware a full-Wintel box the same size as the MobilePro, and you'd have a killer system.

Then I recalled that I've reviewed a couple of machines that almost fit that description: Sony Corp.'s Vaio C1 PictureBook [Technology, April 19, 1999] and IBM's ThinkPad 240 [Technology, Nov. 15]. The Sony had the wide screen and small size, but its keyboard was just small enough (75% of the standard size) that I couldn't type well. The ThinkPad had a great keyboard, but its normal-aspect 10.4-in. screen was never bright enough.

Thus, the 6-lb. Dell machine will (ouch!) continue to crease my shoulder. At least I have the luxury of using the review units that flow through my office. The average user has no such luck.

There's a lesson here for IT. When *Computerworld*'s writers and editors were issued new Dell laptops about six months ago, IT never asked us what we wanted. From IT's support perspective, standardizing on one machine makes sense. But supporting two systems wouldn't be a huge added burden and would keep overly large systems from making life more difficult for all users, all the time.

How to Carry It?

And while I'm talking about choice, how about the carrying case? Most IT organizations just buy the notebook maker's black nylon bag with a shoulder strap. But here too, standardization is just as unproductive as it is with computers. Even when I carry the Dell, I never use the Dell-branded case because it's too big and awkward for me.

I've reported on cases before [Technology, June 21], and I've used several others since then. My current favorite is the $129 Port 2.1 Commuter from Targus Inc., a top-loading model that's the best organized — and one of the best made — of any I've seen.

For trade shows, where I may have to carry a computer for hours, the only answer is a backpack. I've used backpacks from Kensington Technology Group (worked OK but didn't inspire much confidence) and Targus' Port line (terrific padding for your back).

Finally, on a couple of long trips, I've used the ComputerCase from Porter Case Inc., which I reviewed last year. It has the easiest rolling wheels I've seen and fits into overhead compartments as carry-on luggage. Its main drawback is the 13-lb. weight and rather limited capacity. Still, in many situations it's clearly the best choice.

And it's all about choice, isn't it?

Just a reminder
that when it comes to B2C apps,
it's the software, baby.

The majority
of the top
100 Media Metrix
shopping sites
are built on
the Microsoft®
Windows® DNA
development
platform.

Microsoft
Where do you want to go today?®
microsoft.com/dna

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CUT AND SAVE TO EXPOSE ... ITY™ USED BY THOSE HARDWARE COMPANIES TO TRY TO SELL YOU THEIR SOFTWARE.

Web Tech Support Needs Help

You can find anything online, even technical support. But will it solve your problems? By David Essex

TECHNICAL support is an application that's tailor-made for the Web. If you're a do-it-yourselfer, a Web site can hold many of the utilities, software drivers, tips and troubleshooting tools you need to untangle a Windows setup or install a DVD drive. And the people you turn to at your corporate help desk or a vendor's tech-support department can work their magic more efficiently via the Web. Like doctors on call, they can guide you through the simpler fixes remotely via Java applets, Web pages and chat windows before resorting to surgery.

International Data Corp. in Framingham, Mass., says the online technical support market will grow to $10.4 billion by 2002, ranging from corporate outsourcing that costs millions to portals that offer free advice. This technology has the potential to slash support costs for both information technology departments and hardware and software vendors.

Among free and low-cost sites, these four approaches prevail:

- Pure portals bring you to sites and online communities that may have the information and advice you need and also provide original content.
- Automated tools help keep your PC in working order, perform diagnosis and provide the fix when it malfunctions.
- Expert marketplaces match your needs with experts, who bid for the job and then talk you through the fix through a two-way chat window.
- Remote control removes an oft-annoying obstacle between the techie and your computer — you. It's less common than the other three methods but is becoming more popular, especially as a fee-based service.

I looked at sites that emphasize different approaches to get a feel for what works.

MyHelpdesk.com is the best representive of the portal style, although competitors Service-911.com and TechPointer.com are interesting alternatives.

Expertcity.com competes directly with pricey outsourcing vendors and indirectly with portals All.com, NoWonder.com and Exp.com. This expert-centric site services companies like Dallas-based CompUSA Inc. and Sun Microsystems Inc.

Finally, I wanted a site with self-help information and tools. The paid McAfee.com Clinic was weak on information, while PCpitstop.com and Aveo Inc.'s Attune monitoring agent (*www.aveo.com*) both seemed limited. So I chose PC Support Center (*www.pcsupport.com*), a portal that's bolstered with optimization utilities and links to live experts.

I took the same Internet Explorer 5 dial-up problem to all three. Though I prefer PCsupport.com for its breadth of features, I can't recommend any of these sites wholeheartedly. I expect they'll improve as they add paid features, such as remote-control software, that are more likely to fix problems.

Motive Communications Inc. (*www.motive.com*) in Austin, Texas, has found a better way to offer support. Its turnkey support portal is used by Dell Computer Corp., The Walt Disney Co., Kmart Corp., Merrill Lynch & Co. and others. Motive's client software monitors your system and offers an automated fix, then other self-help tools, while a live help-desk technician stands by.

Unfortunately, this clever, labor-saving combination of workflow, automation and the human touch is available only inside corporations, though PCsupport.com has plans to offer a co-branded Motive link. Though I got to see only Motive's Shockwave slide show, I felt I was looking at the future of tech support.

Essex is a freelance writer in Antrim, N.H.

Expertcity.com

Expertcity.com Inc.
www.expertcity.com
Price varies by expert

Things didn't go well on my first dates arranged by virtual matchmaker Expertcity.com. After I typed my problem, I got an offer of free help, but that expert couldn't seem to get through after I downloaded the screen-sharing plug-in. A message popped up saying my expert hadn't shown up, followed by automated apologies and a suggested but unhelpful fix. Another time, no one bid on my problem; minutes later someone confessing unfamiliarity with the problem offered to help me search for an answer for $10.

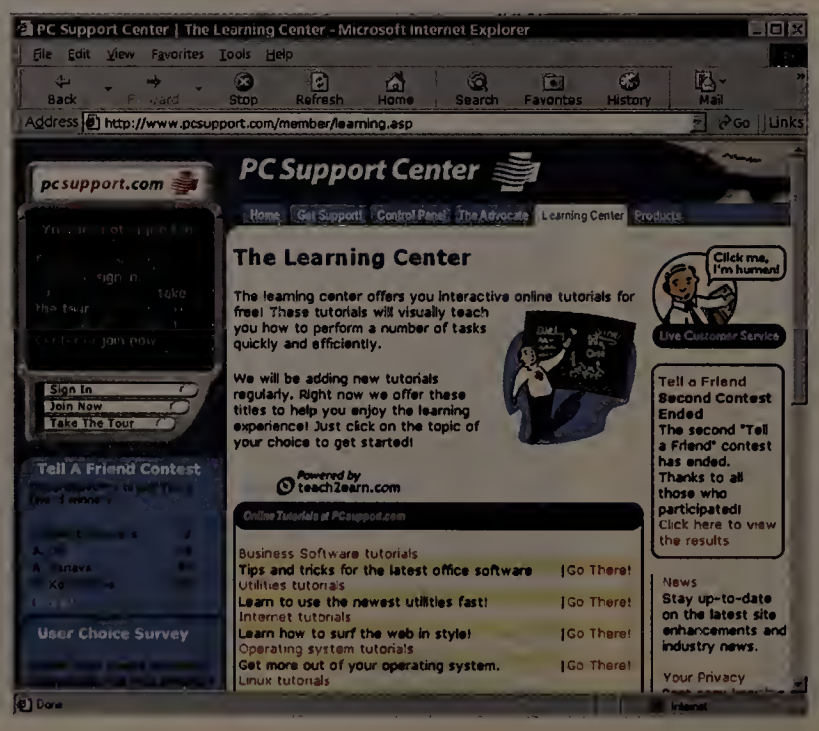
Expertcity.com takes an eBay-like reverse-auction approach, providing profitable opportunities for techies as well as user help that sits in a sweet spot between free-but-worthless and primo-pay-through-the-nose. The site plans to add voice over IP that will let experts talk to customers through the Web connection. It already has the all-important remote-control feature that I think is key to these sites' long-term viability. Expertcity.com is really a whiteboard that lets the expert see your screen and control your mouse and keyboard. It should be adequate for most fixes.

MyHelpdesk.com

MyHelpdesk.com Inc.
www.myhelpdesk.com
Free

This personalizable site uses a one-time survey to tailor what you see on later visits. MyHelpdesk.com featured products from Microsoft as well as Qualcomm Inc.'s Eudora and systems that were similar to but not exactly like my Compaq Corp. Deskpro EN and Hewlett-Packard Co.'s Pavilion PCs.

The problem is that you're linked to promising FAQs and Productivity Tips & Tricks that lead only to an unhelpful list of vendor links; plus a computer glossary, a context-sensitive search window and links to sites such as online training services and Usenet.com groups. I still had to search the linked sites for any hint of my problem, saving hardly any time. I question the value of pure portals like MyHelpdesk.com; they expedite the search process but never really address a specific problem, except by chance.



PCsupport.com Inc.

www.pcsupport.com
Most features are free for now; premium services vary

My favorite among the three sites, PCsupport.com, has more of what I'm looking for in a support portal.

Besides standard fare like site-link directories and online communities, it offers a nice mix of e-mail and live responses, as well as Fix My PC, a feature that lets remote technicians take over.

A software update feature scans your PC for old versions of programs, then presents links to vendor sites that offer free or paid upgrades. I skipped upgrading, though, because the site threw me right to the vendors' file transfer protocol sites without telling me how big the downloads were or why I should want them. You can run applets that perform disk optimization and check for viruses and get 25MB of free online backup. A list of tutorials looked too narrowly focused to be of use, though.

I got a free, live chat response to my problem within three minutes, but the promising tip ultimately didn't work. Still, I'm encouraged by the level of service offered by PCsupport.com and expect to visit often, even when it starts charging for more – but not all – of its services, including a Motive feature that could cost as little as $30 per year.

Redundant Arrays of Independent Disks

BY KATHLEEN OHLSON

A REDUNDANT array of independent disks (RAID) is a common system for high-volume data storage at the server level. RAID systems use many small-capacity disk drives to store large amounts of data and to provide increased reliability and redundancy. Such an array appears to the computer as a single logical unit consisting of multiple disk drives.

RAID storage can be done in a number of ways. Some RAID types emphasize performance, others reliability, fault tolerance or error correction. Which type you choose depends on what you're trying to accomplish.

Common to all RAID systems, however — and their real advantage — is the "hot-swapping" ability: You can pull out a defective drive and insert a new one in its place. For most RAID types, data on a failed disk can be rebuilt automatically without the server or the system ever having to be shut down.

RAID isn't the only way to protect large amounts of data, but regular backups and mirroring software are slower and often require shutting down the system if a drive fails.

Even if the disk doesn't crash the server, information technology workers would still need to shut down the servers to replace the drive. RAID instead rebuilds data from the remaining drives using mirrored or parity information, without requiring a shutdown.

The three most common RAID implementations are Levels 0, 3 and 5.

RAID Level 0, data striping, is the most basic model. On a normal hard drive, data is stored on consecutive sectors of the same disk. RAID 0 uses a minimum of two disk drives and divides data into blocks that range from 512 bytes to several megabytes, which are written alternately to the disks. Segment 1 is written to Disk 1, Segment 2 to Disk 2, and so on. When the system reaches the final drive in the array, it writes to the next available segment of Drive 1, and so forth.

Striping the data distributes the I/O load evenly across all the drives. And since drives can be written to or read from simultaneously, performance increases noticeably. But there's no data protection. If a disk fails, data is lost. RAID 0 isn't for mission-critical environments, but it's well suited to applications such as video production and editing or image editing.

RAID Level 3 includes data striping, but it also assigns one drive to store parity information. This provides some fault tolerance and is especially useful in data-intensive or single-user environments for accessing long sequential records. RAID 3 doesn't overlap I/O, and it requires synchronized-spindle drives to prevent performance degradation with short records.

RAID Level 5 is similar to Level 0, but instead of dividing data into blocks, it stripes the bits of each byte across multiple disks. This byte-striping adds overhead, but if a drive fails, it can be replaced and the data reconstructed from parity and error-correcting codes. RAID 5 overlaps all read/write operations. It requires three to five disks for the array and is best suited to multiuser systems that don't need critical performance or that do few write operations.

Less Common RAID Types

RAID Level 1 is disk mirroring — everything written to Disk 1 is also written to Disk 2 and can be read from either disk. This provides instant backup but requires the highest number of disk drives and doesn't improve performance. Offering the best performance and fault tolerance in a multiuser system, RAID 1 is the easiest configuration to implement, and it works best for accounting, payroll, financial and high-availability data.

RAID Level 2 was developed for mainframes and supercomputers. It corrects data on the fly, but RAID 2 is prone to high error-checking and correcting ratios.

RAID Level 4 includes large stripes so that records can be read from any single drive. It's rarely used because it lacks support for multiple simultaneous write operations.

RAID Level 6 is rarely implemented commercially. It extends RAID 5 using a second parity scheme distributed over different drives. It can sustain multiple simultaneous drive failures, but performance, especially for write operations, is poor, and the system requires an extremely complex controller.

RAID Level 7, offered only by Storage Computer Corp. in Nashua, N.H., includes a real-time embedded operating system as a controller and high-speed bus for caching. It gives fast I/O, but it's expensive.

RAID Level 10 consists of an array of stripes, in which each stripe is a RAID 1 array of drives. This has the same fault tolerance as RAID 1, and it's aimed at database servers requiring high performance and redundancy without high capacity.

RAID Level 53, the most recent type, is implemented as a Level 0 striped array, in which each segment is a RAID 3 array. It has the same redundancy and fault tolerance as RAID 3. This could be useful for IT systems needing a RAID 3 configuration with high data-transfer rates, but it's expensive and inefficient. ◗

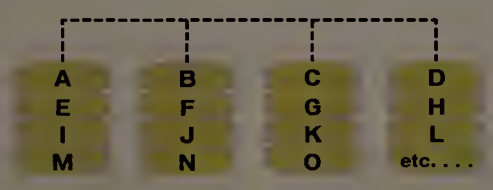
DEFINITION

Redundant arrays of independent disks (RAID) is a system of data storage that uses multiple hard disk drives to store data. A variety of different storage techniques can be used to achieve different levels of redundancy, error recovery and performance.

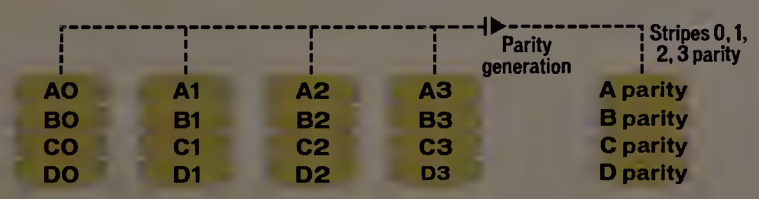
How It Works

These diagrams illustrate how the three most common RAID types work. The vertical stacks of cylinders each represent a single disk drive. The letters A, B, C etc. (or A0, A1, A2 etc.) represent the order in which data is written to the disk.

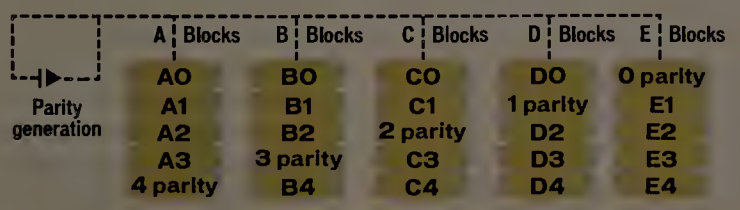
▸ **RAID 0:** Striped disk array without fault tolerance



▸ **RAID 3:** Parallel transfer with parity



▸ **RAID 5:** Independent data disks with distributed parity blocks



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Building a Better Laser

The technology that conjures images of medical miracles and space wars is everywhere in modern life and becoming the key to high-speed communications. By Mathew Schwartz

THEY'RE THE BASIC parts of your CD player, the supermarket checkout scanner and the writing head of your laser printer. But when most people think of lasers, it's in terms of the frontiers of medicine — if not as the weapon of choice for extraterrestrial evil geniuses. One legacy of lasers' prominence in science-fiction books and movies is their power as symbols of futuristic technology, even as they've become the backbone of the telecommunications industry today.

Now Novalux Inc., a Sunnyvale, Calif.-based start-up, has invented a new laser, called the Novalux Extended Cavity Surface Emitting Laser (NECSEL). The NECSEL greatly increases the amount of information that can be inexpensively sent over fiber. That's music to the ears of an industry growing at 40% per year. Soon, lasers could even let you communicate wirelessly, or they could substitute for the picture tube in your television.

"The simplistic concept [of lasers] probably derived from that old James Bond movie of a laser driving down at Sean Connery. It was a big-old device with a circular beam coming down. Conceptually, that's kind of correct, but all lasers today with those big beams come from gas or material lasers," says Malcolm Thompson, president and CEO of Novalux and former chief technology officer at Xerox Corp.'s Palo Alto Research Center. More common today are minute semiconductor lasers, such as those found in the printer heads of laser printers.

HOW LASERS WORK

When the U.S. Academy of Sciences made its list of the top 20 scientific accomplishments of the 20th century, lasers and fiber optics were on it, alongside electrification. But when the laser was invented, it wasn't to solve a pressing social or scientific problem.

"A number of my friends used to kid me about it — 'Nice solution, but what can it do?' They didn't see much in it," says Charles Townes, a scientific adviser to Novalux. He is honored as co-inventor of the maser — which is similar to a laser but uses microwaves rather than light — and the laser. Townes received the first patent for lasers as telecommunications devices in 1960. In 1964, he was awarded the Nobel Prize in Physics.

Townes, then on the faculty at Columbia University in New York, had set out to invent a better method for measuring light waves.

"I'd never heard of a detached retina, but that was one of the first medical applications for lasers," he says.

Lasers are more commonly used to tune fiber-optic transmissions, generate and amplify signals and distribute those signals via fiber optics. To understand what constitutes a laser telecommunications breakthrough, it helps to understand how lasers work.

Laser stands for "light amplification by stimulated emission of radiation." Simply put, when you stimulate the electrons in an atom, they jump to a higher-energy orbit. But because this orbit is unstable, the atoms fall back into their normal orbits, emitting photons — light waves — as they do so. This is the principle behind anything that emits light.

Identical atoms will have identical jumps in energy states when stimulated and also travel in parallel. If you can make multiple atoms release light energy simultaneously, then those light waves will stimulate one another, increasing in power until they potentially produce a large, coherent beam. On the other hand, if a wave contacts an unexcited atom — as often happens — the wave dissipates.

In the early history of lasers, finding the appropriate material to stimulate atoms to the point where they would "lase" — produce laser light — was the Holy Grail. Theodore Maiman solved that problem by using a synthetic ruby to build the first working laser. Both sides of the ruby were reflective, though one only partially. Maiman pumped blue light into the ruby, which interacted with chromium impurities, thus exciting the atoms and producing laser light.

Maiman's was a solid-state laser — the solid being a ruby — but there are various media that lase: solids, gases, liquids and semiconductors. Each produces beams of various frequencies and strengths, all suited to different applications. Large lasers that cut materials — such as the one used against James Bond in *Goldfinger* — are typically gas lasers.

A BETTER BEAM

On the other hand, semiconductor lasers, which are much more common, are very small and use very little power. There are two kinds: edge-emitting and vertical-cavity.

FIBER OPTICS 101

What: Fiber-optic cable

Size: 1/25 the width of a human hair – about 10 microns

Cost: Fiber cable is cheaper than copper wiring, but the switching equipment – lasers or otherwise – that's needed to send information through fiber is more expensive.

Bandwidth: Fiber-optic cable has relatively high bandwidth – more than 5 terabytes/sec. in each of more than 80 channels.

Analogy: To understand how fiber-optic cables work, think of FM radio. Just as you can choose from among various co-existing radio frequencies, you can tune into various colors of light on one fiber-optic cable.

Cheaper lasers mean: More information can be sent over existing fiber-optic lines more cheaply. As costs go down, it will even become cost-effective to add fiber to the so-called last mile up to the curb or even into residential homes.

Future watch: "The two barriers to deployment [of fiber optics] are availability and cost. The technology exists; all that is needed is the laser itself," says Gary Oppedahl, vice president of operations at Novalux.

In edge-emitting lasers, which are less expensive than vertical-cavity lasers, the sides of the semiconductor are cleaved to make a mirror, and the beam shoots out of the edge. While more than 50 million are manufactured every year and used in devices such as CD players, the mirrors and thus the beam are imprecise and aren't suited to high-speed networking.

Fiber optics relies upon the more precise vertical-cavity lasers. These are created on small wafers by the thousands; the lasers themselves can be smaller than 1mm^3. Manufacturers create very precise beams by building more than 100 layers into each mirror — known as the upper and lower Bragg mirrors -- on the laser.

Precision also begets efficiency: Whereas an edge-emitting laser in a CD player requires about 30 milliwatts to function, a vertical-cavity equivalent would require only 2 milliwatts. The rounder the beam, the more precisely the laser "couples" with the fiber-optic cable, sending signals farther down the cable before they need to be strengthened, which saves money. More powerful lasers also increase transmission efficiency.

Novalux has invented a more powerful, 300-milliwatt vertical-cavity laser that is smaller than similar lasers and less expensive to manufacture. "The things that limit the continued extensibility of the fiber-optic network are cost and performance of future lasers. Lower cost could drive much more fiber into metropolitan areas," says Thompson. Fiber-optic cable is cheap; lasers aren't. Thompson predicts his company will eventually be able to create a very small 1-watt NECSEL as well.

FAST FORWARD

Expect to see the NECSEL hit the market early next year, assuming it completes mandatory testing conducted by Telcordia Technologies Inc. (formerly Bellcore). Morristown, N.J.-based Telcordia certifies that third-party equipment meets networking standards. In the meantime, new uses for lasers are continually being invented. The following are several examples:

▸Wireless data transmission: Lasers can be used for so-called free-space data transmission — such as that offered by start-up TeraBeam Networks in Seattle, which uses lasers for wireless, line-of-sight networking. It could be especially cost-effective in metropolitan areas. One advantage is that the medium — air — is unregulated and therefore cheap. A disadvantage is that poor weather can compromise beam quality. TeraBeam expects to introduce products to service most major U.S. markets within three years.

▸Fiber to the curb and home: The barrier to ubiquitous high-speed household and business access is the so-called last mile. Because of the expense of laying fiber-optic cable and the lasers needed to send signals, most telecommunications companies use copper to cross the last mile. However, copper wires can't carry more than 10M byte/sec. Lines can be used in tandem to improve that performance, but then the cost increases. Once the price of lasers decreases and they can be installed in every home cost-effectively, fiber optics and greater bandwidth for the home will be viable.

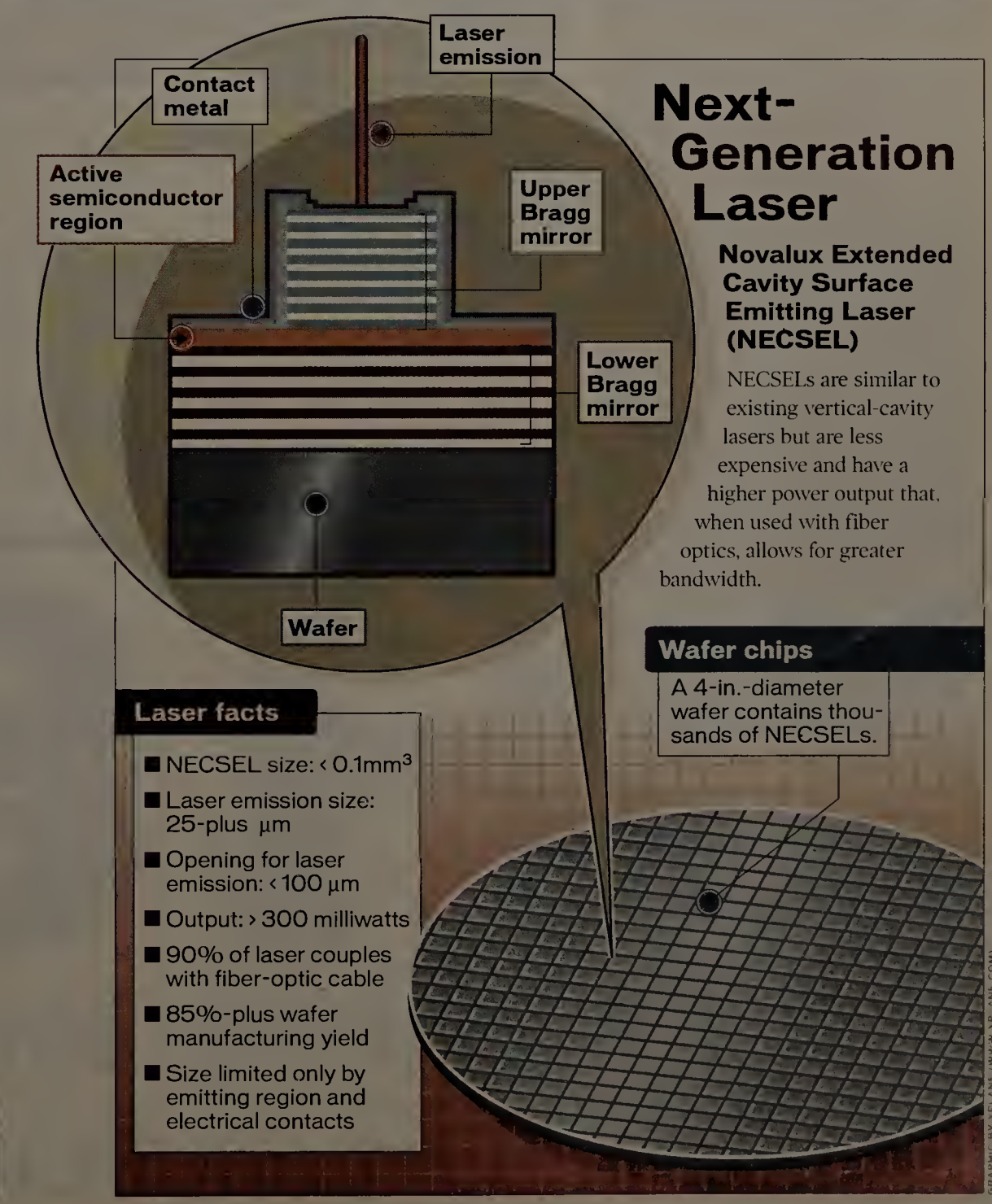
▸Automotive: "You can expect to see fiber in every car," says Gary Oppedahl, vice president of operations at Novalux. "Why do you need something that fast in a car? Weight." Automakers are adding more and more systems to their cars but are constantly trying to lighten vehicles. Mercedes-Benz is already using fiber to keep weight down. Just as copper wiring in cars was replaced by silicon, so, too, will fiber, a plastic, further decrease the loads of today's cars.

▸Digital theater: "If you've got a beautiful, circular, well-behaved beam, you can project it infinitely and begin talking about electronic cinema," says Thompson. Since lasers provide almost molecular-level control of an image, very controlled front- or rear-projection displays ranging from desktop to cinema size or greater are very possible, at exceptionally high quality. In the near future, TV tubes and flat-panel displays could become obsolete.

▸Lidar: Light detection and ranging (lidar) is similar to radar. But where radar uses radio waves to measure speed, distance and direction, lidar relies upon a laser diode. It also uses a much narrower beam, producing better readings. Unlike conventional radar, laser light is potentially much harder to detect, making it preferable for military uses. Still, the overall size of lidar units has to decrease before they will become ubiquitous in aircraft.

▸Mars rock analysis: NASA may soon be using laser-induced spectroscopy to explore Mars. Since materials in the planet's desert environment are often very weathered, they can be coated with up to 2mm of clay and other compounds. Lasers, when applied to soil, air or water samples, burn through the weathering and evaporate samples. Because each atom emits a unique spectral signature, scientists will be able to discern the composition of samples, even when elements exist in as few as 2 parts per million. ◗

> A number of my friends used to kid me about [lasers] — 'Nice solution, but what can it do?' They didn't see much in it.
>
> CHARLES TOWNES, SCIENTIFIC ADVISER, NOVALUX INC., AND CO-INVENTOR OF THE LASER



Tighter Links, Ship to Shore

Once remote management is in place, Royal Caribbean hopes to tap GPS information

Throughout each of Royal Caribbean's ships, two main computer systems cross each other without intersecting: One controls the hotel operations, while the other controls engineering and navigation.

Although the two systems won't be joined, a nodding acquaintance is planned between some applications, says Chris Vecchiolla, project manager at Royal Caribbean's Unicenter Development Group.

From the bridge, the crew can control not only navigation, but also the distribution of ballast, the ship's inventory of spare parts, weather reporting, mapping and fire systems.

What Vecchiolla says he looks forward to, however, is using the ships' Global Positioning System (GPS) devices, which pinpoint each ship's position.

For support staff at Royal Caribbean's Miami headquarters, "I want to present each ship's location accurately represented as a dot, say, placed on a map of the world by the GPS onboard each ship," Vecchiolla says.

A mouse click on each dot could also bring up such information as a crew list and local time for the ship. With liners regularly cruising the other side of the globe, the window of time to contact staff onboard can be narrow, he says.

Bridge computer systems on the 17 ships in Royal Caribbean's fleet are a hodgepodge of Unix- and Windows-based systems, with minimal integration between what are generally proprietary applications, says Roger Svinoe, staff captain aboard Royal Caribbean's *Enchantment of the Seas*.

But systems aboard four ships under construction are state-of-the-art, with fiber-optic cabling and an integrated management system, Svinoe says.

The first onboard computer – a 286 PC – was installed in 1982, says *Enchantment* chief engineer Ole Pedersen.

But for some of the crew, it's hard to accept the use of computers , says Capt. Per Arne Kjoensoe. Computers haven't been integral to maritime tradition, he says.

But they will be, says Svinoe, grinning. "I brought my own laptop aboard," he says. "Now I'm trying to convince them of all the things we could do with a digital camera."

– Sami Lais

THE RECENT "Love Bug" virus gave Royal Caribbean Cruises Ltd. a chance to battle-test its wireless remote management project.

From Royal Caribbean's Miami headquarters, information technology staff shut down mail servers aboard four ships and downloaded the definitions of the bug so antivirus software already on board could combat it. "It took us about 15 seconds," says Chris Vecchiolla, manager of the $8 million project.

WIRELESS NETWORKS

Doing manual updates "would have taken two or three days to kick off the update" aboard one ship, says Gareth Owen, systems administrator on Royal Caribbean's liner, *Monarch of the Seas*.

For most businesses, rolling out a wireless remote management system for all global operations would be taking something of a flier.

Royal Caribbean, now one-third of the way through the rollout, didn't have a choice, says CIO Thomas Murphy.

"The technology is becoming so much more important in running a cruise ship," Murphy says. "Customer satisfaction depends on it, but so does the basic operation of the ship."

When planning for the systems overhaul began nine months ago, "a key consideration was support," which was frustrating because technology on each ship varied so widely and nontechnical users were often unclear about the exact nature of problems, Murphy says.

'All Over the Map'

Hardware configurations aboard the fleet "were all over the map," he says. Some ships had 56K bit/sec. connections, others had 128K bit/sec. lines. "And I think we counted 35 different [database systems] aboard the different ships," he says.

Each ship's crew has two IT professionals, but they lack high-level network management skills, says Vecchiolla.

"With ships all over the globe . . . we spent a lot of time and money talking people through solutions or flying support staff sometimes halfway round the world," he says.

Two years ago, Royal Caribbean bought Celebrity Cruise Lines, bringing to a total of 17 its fleet of floating hotels, complete with restaurants, casinos, swimming pools, duty-free shopping and Internet cafés. A dozen more are under construction.

Along with massive engines, swimming pools and teak decking, new construction will include miles of special, marine-quality cable to network about 150 desktops and 20 servers — all part of the "floating hotel" infrastructure, Murphy says.

In addition to conventional systems for the marine equivalent of a hotel business office — the purser's office — new ships will have point-of-sale machines in gift shops, on-demand movies and interactive TV in cabins, a public branch exchange telecommunications system, an Internet café and an enhanced access-control system, he says.

But building systems infrastructure during new construction is easy, Murphy says. What's hard is retrofitting existing ocean liners.

Standardizing all IT came first. Murphy's team decided on a "Microsoft-centric focus," the CIO says. "We're using Microsoft DNA, SQL Server and Oracle for our database," he says.

Running on all the machines will be system management framework CA-Unicenter: The Next Generation (TNG) from Computer Associates International Inc. in Islandia, N.Y., says Murphy. Modules for remote management and software distribution will be implemented first.

Software distribution is time-consuming enough "in an earthbound distributed business environment," whose "deployment accounts for 60% of the cost" of software distribution projects, he says. "Think about doing it in an environment where your business units are in a different place every day. The cost is horrific."

The Unicenter TNG implementation will save money, Murphy says, "but we intentionally did not sell it [to top management] on the basis of its ROI. We sold it as an enabling technology" that would let the IT department better support Royal Caribbean's business users.

Business Imperative

"We could have done an ROI study, based on cabin revenues, travel costs, downtime and so forth, but [management said], 'Don't waste your time; the Unicenter deployment is a business imperative.' That was kind of nice, having senior executive staff savvy enough to embrace the technology," Murphy says.

The deployment begins in the company's testing lab in Miami.

"We can do quite a bit of configuration of the TNG server in the lab," Vecchiolla says. "We ship it out early; another group puts it on the rack and networks it. Any remaining configuration we do via satellite" phone connection.

"For any patches or tweaks, it doesn't matter if it's here or we're standing next to it," Vecchiolla says.

During this time, the team works with the administrators onboard "to knock out any problems in the servers and prepare the workstations for the TNG deployment," he says. Onboard staff visit each workstation and load the Unicenter agent that lets the framework manage the machine.

"TNG and the options we bought work pretty well. The problems we've run into have been ones we've created in our own environment" by tweaking the systems' configurations, Vecchiolla says. "So we asked the managers [onboard] to rerun NT Service Pack 5" on

JUST THE FACTS

Royal Caribbean's Software Rollout

Initially:

- Unicenter TNG framework
- Remote control option
- Software delivery option
- Asset management option
- InocuLAN antivirus
- Automation point option for Unix servers

Coming:

- Automated monitoring of servers
- Neugents neural network for Windows NT networks
- PeopleSoft 8.0
- Centralized data warehouse

Sate

Royal Caribbean (
remote managem

THOMAS MURPHY, CIO at Royal Caribbean, says not going wireless would have been a cruise toward disaster.

TOM SALYER

both clients and servers to be sure each had identical updates and to standardize configurations, he added.

Keeping detailed records of problems and solutions helped identify patterns and prevent problems in subsequent rollouts, Vecchiolla says.

"So does documentation, which I've been doing from the get-go," he says. He's used RoboHelp Office 2000 automated documentation generation software from Blue Sky Software Corp. in La Jolla, Calif.

"The first rollout took seven people three weeks," Vecchiolla says. But his team learned from its mistakes, and two people completed the deployment at the fourth vessel in one week, he says.

Workstations as well as servers are being standardized, Murphy says. For Royal Caribbean, having its Windows NT client environment locked down is a necessary evil, he says.

It's the only way to make the new 128K bit/sec. connection (which optimally works at 256K) suffice for all ship-to-shore communications, Vecchiolla says. That includes all voice channels, faxes, data transfers, Unicenter transactions and generic file transfers, he says.

"If I were to do it all over again, I think terminal servers would be a good solution for the basic user who might not need a PC," Vecchiolla says.

Via satellite link, support staffers simply take control of the PC and solve the problem.

Owen received "basic hands-on TNG training," he says. But further training can be handled remotely in real time, says Amir Siddiqi, CA's managing consultant on the project. With the system in place for only about a week, Owen says he isn't quite used to it yet. "I get a call, and I find myself walking out the door before I realize I don't need to do that anymore," he says.

"It's a big ship. Getting to a call can take 20 to 30 minutes," Owen says. "Support-call response time has been cut dramatically," he says.

In its planned move to a centralized data warehouse, Royal Caribbean has run into the limitations of satellite communications, Murphy says.

"Two-hundred-fifty-six K bit/sec. is about as fast as it gets," he says. More often, it's 128K bit/sec., about equivalent to an Integrated Services Digital Network line, Vecchiolla says. That's not fast enough to support ships' operations, a land-based central database and the company's planned implementation of PeopleSoft Inc.'s enterprise resource planning software.

The project has been the victim of its own success, Vecchiolla says. "For anyone rolling out a similar project, I'd say, 'Watch out for scope creep,' " he says.

What other advice would Vecchiolla offer anyone trying a similar project?

- Set up a lab to simulate the actual environment, including wireless-speed connections and every product and application.
- Build a two- to three-month grace period into the schedule. If wireless systems aren't the norm, neither are the environments in which they're installed. Working around sailing schedules, for example, was a challenge, Siddiqi says.
- Know the culture of the business. "In a marine environment, the captain is the boss," Siddiqi says. The work schedule for the IT team, as for all other departments aboard, had to be OK'd by the captain, he says.
- Manage expectations. Vecchiolla informed users about remote management, Owen says, "so people didn't think we were spying on them."

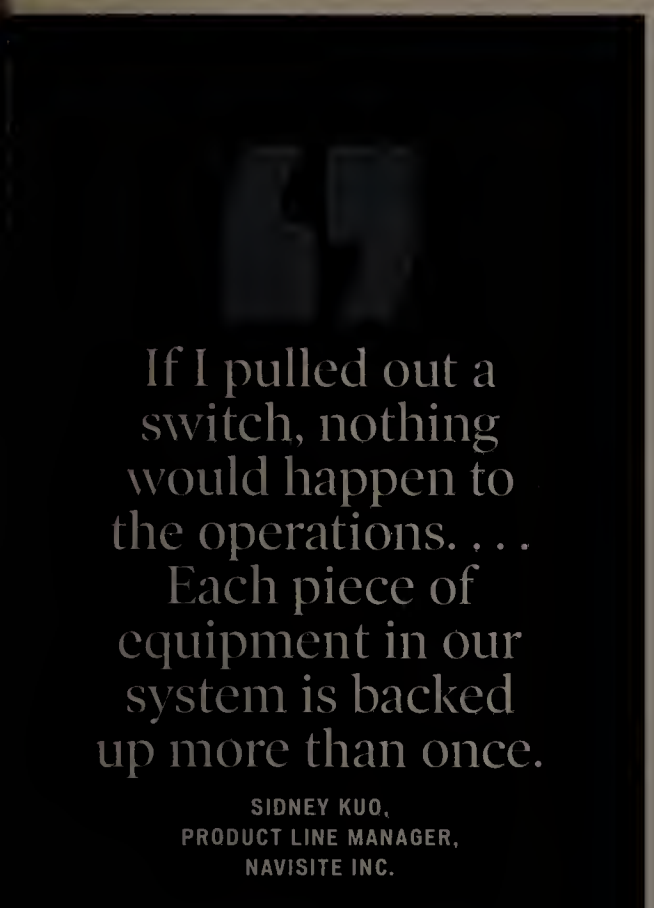
With four installs under their belt, the biggest challenge now is logistical, says Vecchiolla. Ship schedules won't shift to allow "one more day," he says. ◗

ellite Ho!

ruises sets sail into wireless ent — and stays afloat. By Sami Lais

JOHN SOARES

In the Trench



If I pulled out a switch, nothing would happen to the operations. . . . Each piece of equipment in our system is backed up more than once.

SIDNEY KUO,
PRODUCT LINE MANAGER,
NAVISITE INC.

Here's an inside look at how an application service provider works in a market where flawless performance and reliability are a must. By Dawne Shand

es at an ASP

PAYING A MONTHLY FEE to have someone else buy, configure and manage all the equipment your business uses, maintain your company's network connection to the Internet and troubleshoot the inevitable glitches in both hardware and software sounds like a way to eradicate many information technology headaches. At least that's what application service providers (ASP) are banking on.

During the past year, the nascent ASP market has attempted to take on the hosting and management of many complex applications, for both small and large enterprises. The number of headaches they've alleviated, however, has yet to be determined.

Renting can have its downside, too: Customers don't define how an ASP avoids trouble, and they don't control its responses to problems; that happens in the data center. So if you're going to use a service provider, you need to carefully check out its operations. With this in mind, *Computerworld* visited NaviSite Inc.'s data center in Andover, Mass., to see what we could learn about the ASP business.

Row upon row of black racks and boxes are arrayed inside NaviSite's 20,000-square-foot data center. The center, which opened in January, will eventually grow to 52,000 square feet, according to company officials. NaviSite, just three years old, outgrew its first center last year.

NaviSite started out as the internal IT department of CMGI Inc., a venture capital group also based in Andover. Back then, the group hosted and managed many of CMGI's Web businesses and gained expertise in finding and solving problems in Web applications that were becoming increasingly complex.

CEO Joel Rosen says the company is capable of performance management because "NaviSite cut its teeth working with sophisticated businesses."

NaviSite specializes in e-commerce applications. It provides a fixed-network architecture that's built using routers and switches from Cisco Systems Inc.; FireWall-1 from Check Point Software Technologies Ltd.; storage equipment from EMC Corp., Compaq Computer Corp. and Dell Computer Corp.; and load-balancing equipment such as a switch from ArrowPoint Communications Inc. or Cisco's LocalDirector product.

Customers can rent whatever equipment is appropriate to their needs, leaving management and maintenance to NaviSite. A few customers rent the equipment from NaviSite but choose to operate and maintain it themselves.

NaviSite also provides software such as Sun Microsystems Inc. or Windows NT servers, Oracle Corp. or SQL Server databases, Allaire Corp.'s ColdFusion Web application server and SilverStream Software Inc.'s Application Server. If customers choose one of the primary software offerings, NaviSite can provide a range of performance management services, from preventive maintenance to on-the-spot repairs. If NaviSite doesn't know a specific piece of software well enough to perform all maintenance itself, it won't guarantee

In the Trenches At an ASP

that level of service but will still locate any problems that arise and help coordinate solutions. NaviSite knows that its success depends on keeping the power on, the applications running and all connections open to its customers.

Powerful Preparation

Sidney Kuo, NaviSite's product line manager and a mechanical engineer by training, points out details in NaviSite's data center with an engineer's pride. Beneath the raised floor of the data center, a 24-inch crawl space (double the requirement) makes it easy to run and fix the wiring that connects applications to the Internet.

In the rear of the data center stands a row of black cabinets that funnel electrical power to the systems. "Electricity is key," Kuo says simply. "Without it, nothing runs, and that would be a problem."

A few weeks before *Computerworld*'s visit, a motorist hit a utility pole on a nearby road and knocked out power to the building for the first time since the new data center went into operation. Kuo watched vapor from the backup generators begin to appear just 10 seconds after the cafeteria lights went out. Electricity was restored later that day.

In the event of an electrical outage, battery power takes over immediately, giving the four diesel generators a chance to warm up. Combined, the generators can generate 2,500 kilowatts of power — enough to keep the center going indefinitely, as long as there's a steady supply of diesel fuel. In the event of a more devastating power outage, NaviSite has a second data center on the West Coast that operates on a separate power grid. The company refers to this as "N+1" redundancy: batteries, electrical generators, backup generators and separate power-grid coverage.

Next to the electrical panels stand locked cabinets containing each customer's equipment. Each cabinet is marked with a small white label in the upper left corner that indicates its owner or the company using it.

Although Kuo is NaviSite's product line manager, he doesn't have a key to the data center. A security guard has to open the door for him. Only employees who need daily access to the data center have entry privileges, and even they are carefully monitored.

To verify identity, employees run their badges through a card reader and their hands across a palm reader. Even then, they can't get access to customer equipment. Only the guard and the customers have keys to customers' cabinets. And when customers come to the data center, they must tell the guard their passwords to gain access.

In the data center, Kuo pulls out what looks like a football-shaped key ring with a digital face. It's actually a random-key generator that changes and coordinates another set of passwords for the network architecture. Without the updated number, no one has access. The point is to ensure that only a limited number of people can touch or alter anything, especially the core routers that connect NaviSite to the Internet.

The routers, Cisco 6509s, sit in a locked chamber called the main equipment room. The room, like everything else in the data center, exists in duplicate. On the other side of the building, there's another room that contains the exact same setup. The main equipment room is where NaviSite routes Internet traffic.

The fiber-optic cables that connect the data center to the Internet enter at four different locations. It's a hedge against the risk of "backhoe failure" — the possibility that someone might accidentally cut through the fibers while digging up a sewage pipe.

The on-ramp to the Internet is the most compelling reason most customers use an ASP's data center. NaviSite buys backbone Internet access from the major providers: AT&T Corp., Sprint Corp., Cable and Wireless PLC and GTE Internetworking. It's called a private-transit strategy: By paying for backbone access, NaviSite avoids the free but crowded public-access ramps to the Internet.

Between the two equipment rooms are still more black boxes, which back up the information going through the center. Each box contains 500 tapes, and each tape has 70GB of storage space.

Backup may seem mundane, but a storage problem recently brought down ASP Bigstep.com for two days. The San Francisco-based firm had to shut down service while it isolated a problem with its backup devices, and it didn't have a second set of backup equipment that could take over while it fixed the first.

Kuo explains that he could remove any one piece of equipment from the NaviSite equation and the system would continue to function. "If I pulled out a switch, nothing would happen to the operations. The system would reroute traffic," Kuo says. "Each piece of equipment in our system is backed up more than once."

Redundancy — even backup plans for backup failures — defines NaviSite's data center, according to Rosen and Kuo.

Reliability may be essential, but The Dress Barn Inc. in Suffern, N.Y., uses NaviSite because the clothing retailer can rent both hardware and software. Dress Barn has chosen to avoid a heavy investment in equipment as it gears up for Internet retailing. The clothing retailer rents four server licenses from NaviSite.

"It was the service which kept us coming back as we evaluated ASPs," says Chris Correia, Dress Barn's director of IT. NaviSite has kept Correia aware of new technologies and has helped define the software and hardware configurations it will need.

New Technologies, New Expectations

NaviSite has a track record of working with new technology, which company officials say makes it more attractive to customers. Chief Technology Officer Peter Kirwan worked closely with Cambridge, Mass.-based Akamai Technologies Inc. to integrate graphics-caching with NaviSite's service. He says that as Web applications become more complex — requiring separate graphics and ad servers, streaming media and localized versions, for example — companies will have no choice but to rely on a partner.

For example, Kirwan heads NaviSite's streaming media service, which customers can rent. NaviSite can arrange for satellite transmission of live events over the Internet. "Sometimes [customers] have no idea how complex what they ask for really is," explains Kirwan. "And that's the beauty of the managed services model. The partner shoulders the complexity."

FURNALD/GRAY

> NaviSite cut its teeth working with sophisticated businesses.
>
> JOEL ROSEN, CEO, NAVISITE INC.

Herein lies one of the thornier problems in the whole ASP model: the service-level agreement. NaviSite will repair problems in applications that are based on software it knows. By certifying and mentoring its staff, it develops deep expertise in commonly used products such as Oracle databases.

Jay Seaton, NaviSite's vice president of marketing, explains that the company and its customers hammer out the service-level details up front. "A year ago, everyone promised 99.9-something percent availability; it all seemed the same," he says. "If a piece of hardware goes down, we can't possibly replace it in five minutes."

And 99.99% reliability means just that — only five minutes of downtime per month. Forty-five minutes of downtime are allowed with 99.95% availability. NaviSite is wary of making unrealistic promises in the thoroughly unpredictable environment that is the Internet, Seaton says.

The decision to use an ASP boils down to how well it can take care of an application when problems arise. To determine that, you have to visit an ASP's network operating center.

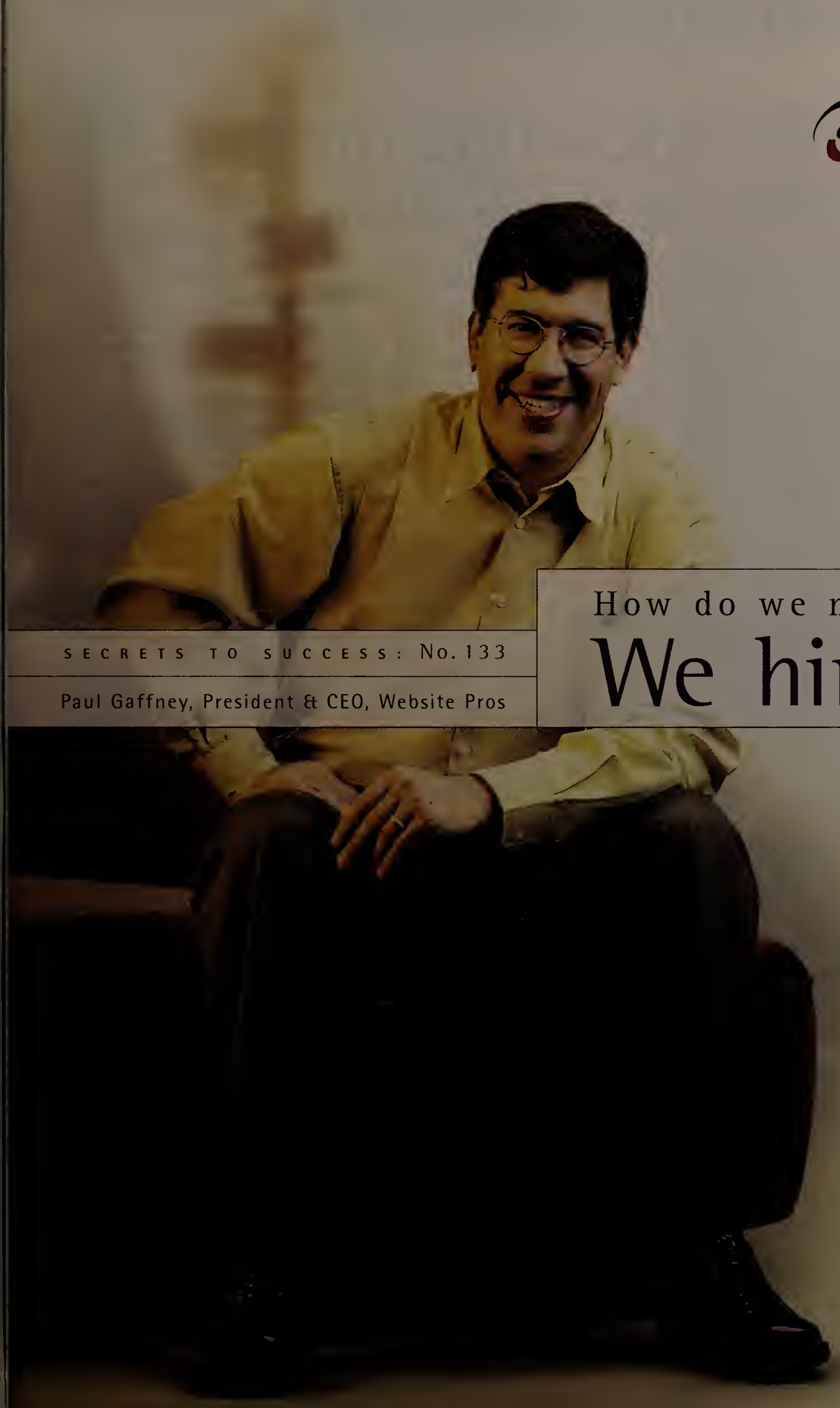
NaviSite's looks like a miniature NASA control station. Within a curved panel are computer monitors manned by the first level of defense in the troubleshooting process. At least three engineers are in the center at all times. They face five large-screen computer panels, but the most important one is on the far left. There, San Francisco-based Micromuse Inc.'s Netcool signals which problems need to be resolved. To the right, Hewlett-Packard Co.'s OpenView provides a picture of the network and its links.

The third screen runs Houston-based BMC Software Inc.'s Patrol, which enables clients to control and modify the site using remote tools. Ninety percent of NaviSite's customers take advantage of these performance management services, and the majority never come to the data center.

On the second floor of the NaviSite building, people plan for the next wave of Internet technology. The only hints of color there — as is the case within the data center and the control center — are the red tanks containing inert gases used to fight electrical fires.

The clearest lesson to be learned from a visit to NaviSite is that contingency planning — even more so than cutting-edge expertise — is the key to an ASP's survival.

Shand is a freelance writer based in Somerville, Mass.



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Start-up Says Broadcasting on Net Just a Phone Call Away

Net Technologies claims quick Web posting of real-time audio streams via telephone

BY LEE COPELAND

MUTUAL fund investment firm Nvest Funds Distributor LP in Boston regularly posts audio clips from its analysts to keep the firm's brokers and investors up-to-date. But it was having a problem: The technology couldn't keep up with the financial markets.

It took a week to receive tapes of earnings conference calls, convert the tapes to digital format, break up the calls into smaller segments and then post the audio clips on the Web. "In the financial markets, so much can happen in a week, sometimes we could not use the recording after doing all that work," said Suzanne Billante, vice president of e-commerce at Nvest.

Catching Up With Internet Time

The situation changed when Nvest began using New York-based Net Technologies Inc.'s DoTell Interactive Server. DoTell lets users quickly and easily create streaming-audio messages directly from a telephone for Web broadcast. Users publish audio messages by calling into a voice-mail-like automated system that requests a personal identification number and a user ID and guides the user through recording and posting a message.

The resulting audio message can be posted directly to the Web in real time or stored for later use. And the system isn't limited to Web broadcast, says Lynda Meyers, Net Technologies' CEO.

"You can send the message to a Web page, send it as e-mail, send it to Net2Phone [Internet communication service] as an instant messaging alert or dial into a voice mail system," she says.

Net Technologies offers DoTell on preconfigured Dell Computer Corp. servers with Windows NT, Linux or Solaris operating system or as a hosted service. Meyers claims that the system provides better scalability and sound quality than competing systems.

Nvest began using DoTell after the company changed its name and CEO. Billante says adding the CEO's voice message to the Web site was an easy and effective way to introduce the new corporate officer to the company's employees. "The most important thing is the simplicity of it," says Billante. "I wrote down all the steps for our CEO to follow to record the message, and he couldn't believe how easy it was."

Billante has been able to cut the time between recording and posting analyst commentary from a week to as little as one hour.

LILY DONG

NET TECHNOLOGIES CEO LYNDA MEYERS says the firm's ongoing Web development work helps it stay close to customers

Net Technologies Inc.

COMPUTERWORLD emerging companies

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Telephone: (212) 889-2015

Web: *www.nette.com, www.dotell.com*

The technology: Telephone voice-to-Internet broadcasting, although most revenue now comes from Web development

Why it's worth watching: The company claims DoTell's proprietary architecture delivers better scalability and sound quality than similar systems. It has few direct competitors in this niche.

Company officers:
- Lynda Meyer, founder and CEO
- Helen Bernstein, senior vice president, marketing and client relations

Milestones:
- April 1995: Company founded
- Jan. 2000: First-round financing
- Feb. 2000: DoTell 1.0 Shipped

Employees: 26

Burn money: $3 million from Tucker Anthony Sutro and $250,000 in private funding from Steve Gottlieb, president of TVT Records

Products: DoTell Interactive Server 1.0, Instimanager online presentation service and the Financial Calculators tool suite

Customers: Morgan Stanley Dean Witter, Nvest Funds Distributor L.P., Commonfund Mortgage Corp.

Partners: RealNetworks, Microsoft Corp., Sun Microsystems Inc., Dialogic Corp. and Level 3 Communications Inc.

Red flags for IT:
- Net Technologies has a good start in the financial and music industries but it must broaden its product line.
- In its Web development business, the company is still a boutique shop competing against larger firms with more comprehensive services.

Fast turnaround is also king at TVT Records, a New York-based independent record label with artists such as Snoop Dogg, XTC and Nine Inch Nails. TVT Records plans to send regular minibroadcasts from its artists' cell phones to *www.tvtrecords.com*. With DoTell in place, TVT plans to offer audio content on its Web site from artists milling around backstage at an MTV award show, hanging out after a gig or stepping off the tour bus. "It will let the fans be a part of the artists' lives and follow them around," says TVT President Steve Gottlieb.

"Instead of reading a typed message, the fans can hear an artist's voice from a concert, and there can't be anything fresher than that," says Gottlieb.

Gottlieb has personally invested $250,000 in Net Technologies. The other first-round investor, investment and brokerage firm Tucker Anthony Sutro in Boston, has provided $3 million in equity financing.

DoTell starts at $25,000 per server and is also available as a hosted system through Net Technologies.

Net Technologies began as a Web development firm focused on the financial sector and has clients such as Morgan Stanley Dean Witter & Co. in New York and endowment fund management firm Commonfund Securities Inc. in Wilton, Conn.

Web site development for financial firms contributes the majority of the start-up's revenue. The company also offers two related products: online presentation service Instimanager and Financial Calculators, a suite of Web-based financial planning tools. But the DoTell Interactive Server is the firm's strategic bet.

"While we were developing products, there was a need for the cash register to go '*ka-ching*,'" says Meyers. "The Web development [work] allows us to be close and intimate with our client and provides a good stream of income." ◗

[the buzz] STATE OF THE MARKET

More Bits for The Buck

The DoTell system includes three primary components: the DoTell Interactive Voice Response (DIVR) system, the encoding system and the Oracle SQL database.

Depending upon the size of the system, these components may reside in separate boxes for scalability and performance. Net Technologies sees this scalable architecture – separating the encoding from the DIVR unit – as its key advantage. "We can get 15 16K bit streams simultaneously on one [DIVR] box," says CEO Lynda Meyer.

Users call into a telephony board in the DIVR, which accepts the user's ID and identification number and queries the database for the user's privileges.

The DIVR then streams the raw digital data directly to the encoder through a proprietary socket layer that runs over a TCP/IP connection, a system similar to other voice over IP schemes.

The encoder converts the stream into MP3, Windows Media Format and Real G2 formats. Data then passes directly to a streaming media server or is saved to disk for later use.

The system also includes a workflow manager component with a Web-based front end for managing incoming messages, and it integrates with the Palm VII so a manager can call in a message, connect to the server with the Palm and add a title or description to the communication before posting it to the Web site.

The Competition

In the telephony voice-to-Internet publishing arena, Net Technologies competes primarily against TellSoft Technologies Inc. in Colorado Springs.

Like DoTell, TellSoft's iTalk is a server-based product for broadcasting voice from the telephone over the Web. However, TellSoft emphasizes its iTalk services offerings rather than its system sales.

Net Technologies claims to offer better sound quality, but TellSoft is more established. Its iTalk Server has been on the market since 1998 and is now at Version 3.0. TellSoft also boasts a portfolio of companion products, including iTalk-Web, for voice Web publishing; iTalk-Live, for Internet broadcasting; and iTalkMail, for voice e-mail messaging.

In the area of Web development for financial services companies, Net Technologies has numerous competitors, including large players. However, the company has few competitors in its primary area of focus. – *Lee Copeland*

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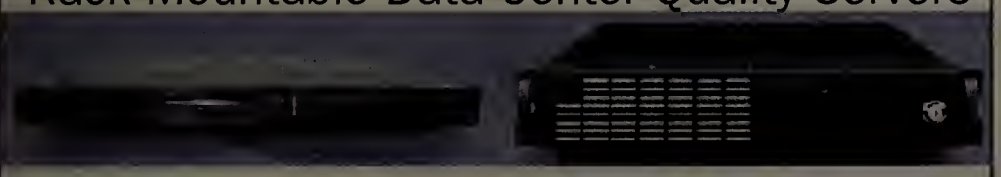

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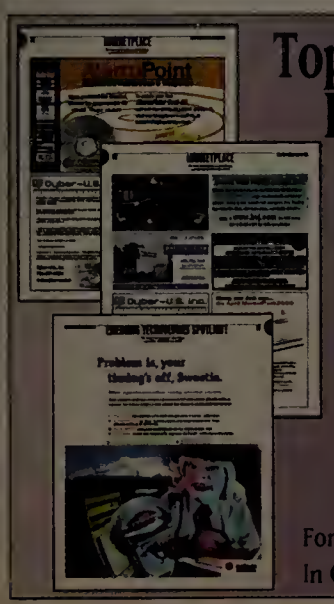

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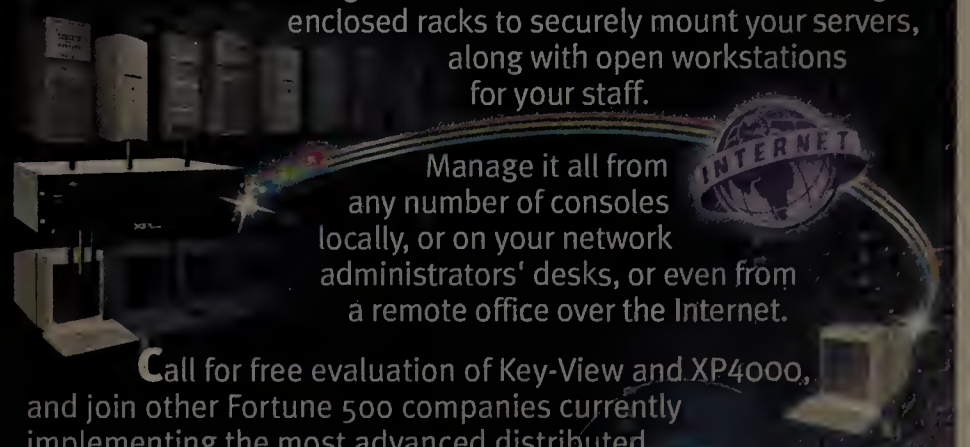

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Where the Best Jobs Are

BY JAMES COPE

IN A FIELD WHERE experience is often counted in months instead of years, definable skills are becoming more important, according to technical recruiters.

In some instances, workers have skills familiar to a specific industry. Others hold a mix of technical skills — knowledge of one more operating systems and programming languages, for example.

And as electronic business becomes business as usual, companies seek experienced people from areas such as marketing who also understand technology. One company even recruits information technology people based on their comfort with the organizational model.

Follow the Money

Although almost all businesses of all sizes are courting IT talent, Greg Scileppi, executive director of IT placement firm RHI Consulting in Menlo Park, Calf., says the financial services area seems especially hot this year.

The trend comes as banks, brokerage firms and insurance companies try to "supply value to their customer base" and become more competitive by developing Internet-based services, Scileppi says.

The skills most needed at financial services companies are those "focused on Web enabling," Scileppi says. They include C++, Visual Basic, Cold Fusion, Perl and Java. "On the infrastructure side, there's a demand for network engineers and senior network engineers," he adds.

You Call That Experience?

In IT, especially electronic business, "finding people who've been there and done that is difficult" says Jack Davis, vice president of Jack J. Davis and Associates Inc., an IT recruitment firm in New York.

Like Scileppi, Davis says he has seen a recent upturn in recruitment engagements from financial services companies, and he's running into a wide variety of firms that want to fill electronic-business slots.

"E-business, e-commerce — this is the hot topic now," Davis says.

Companies are looking hard for electronic-business managers who can develop, implement and manage an entire electronic-business program, according to Davis. Salaries for such positions start at $200,000 and go up from there, and it often takes up to three months to place the candidate. Hiring managers are often short on time, and it may take up to a month just to find a date that all parties can agree on for the first interview, according to Davis.

But experienced electronic-business talent is a contradiction in terms, says Davis, pointing out that "e-business is so darned new."

Successful electronic-business managers don't necessarily come from strict IT backgrounds. Davis was recently asked to find an electronic-business manager for one of his client companies. The individual whom he characterized as the top candidate for the job was someone who "grew up in marketing but obviously had an understanding of tech," says Davis.

That candidate had developed an e-commerce plan and followed it through to implementation for a manufacturing company, giving her the background the employer was looking for, Davis explains.

But Can You Java?

A computer science degree will most always get you a job, but do you have specific skills in addition to the sheepskin? The right combination can unlock the door to dollars.

Guy DesSaulniers, owner of Chicago-based IT recruiting firm DesSaulniers Macleod Ltd., says many of the recruitment contracts he has received in the past six to nine months have been for individuals with multiple sets of specific skills.

For example, a company might want someone with a combination of Java, Unix and ASP skills. "We might have seven Internet orders," DesSaulniers says, "but we may find only one person who fits the exact profile."

ERP Ups and Downs

"The Oracle market is very strong here," but there's been a "huge drop-off in SAP and PeopleSoft" that began in last year's fourth quarter, says DesSaulniers. "Some companies are either taking a third look" at the promises made by the big enterprise resource planning (ERP) vendors, or they have already implemented ERP systems, he says, adding that that combination of factors reduces the salaries companies are willing to pay.

Still, DesSaulniers says he's "seeing demand in the J. D. Edwards area."

The highest salaries in the Chicago area are going to database programmers with five or more years of experience, DesSaulniers says. Salaries range from $80,000 to $100,000 plus a bonus.

"

[Financial services companies are] focused on Web-enabling [and they're looking for] network engineers and senior network engineers.

GREG SCILEPPI, EXECUTIVE DIRECTOR, RHI CONSULTING

ROBERT HOLMGREN

JACK KENNER

"

We love it when we can get people from the gaming industry.

EILEEN CASSINI, VICE PRESIDENT OF IT SERVICES, HARRAH'S ENTERTAINMENT

In a business where various perks and complimentary services are routinely exchanged for customer time at the gaming tables, it's not surprising that gaming corporations like Harrah's Entertainment Inc. in Las Vegas embrace IT people with customer relationship management (CRM) systems skills.

Harrah's Vice President of IT Services Eileen Cassini says the gaming company looks for skills associated with electronic-business. "Anything related to CRM is more pronounced in our industry," she says.

Wanted: AS/400 Expertise

Harrah's has also seen a tremendous shortage of people with AS/400 skills.

"We love it when we can get people from the gaming industry," Cassini says. But that's not always possible, she adds, so the company hires a lot of people from other industries.

Cassini says Harrah's has been especially successful in recruiting IT people from large consulting firms. She says that may be due to the fact that the IT group at Harrah's is organized just like a consulting firm, meaning it offers a familiar environment to prospective recruits from that industry.

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Duties: 1. Day-to-day support of the online environments and batch systems; 2. Backup and recovery of databases; 3. Troubleshooting system and programming problems; 4. Maintaining and configuring the Data Base Management System, including applying Authorized Program Analysis reports, communicating with the Data Base Management System vendor to obtain problem solutions and repairing database corruption; 5. Upgrading to new release of the Data Base Management System; 6. Tuning the online and batch systems in all environments including production; 7. Configuring new and exisiting environments; 8. Administering security with the Central Versions for all users; 9. Performing database restructures for Year 2000 & other enhancement efforts; 10. Performing data modeling, logical and physical database design; and 11. Creating software tools in support of the design and programming effort. Requirements: B.S. in computer science or related field. Must have five years experience as a Database Analyst. At least three of the five years of experience must have included Integrated Data Base Management System 12.0. Salary is $50,000 to $75,000 per year; 40-hour work week; 8:00 a.m. to 4:30 p.m.; Employment is in Denver, CO metropolitain area. Interested applicants should send their resume to the Colorado Department of Labor and Employment, Employment Programs, Tower 2, Suite 400, 1515 Arapahoe Street, Denver, Colorado 80202-2117. Please refer to job order # CO4658377. Interested applicants must have proof of legal authority to work permanently in the United States.

GROUP INFO MGT. MANAGER (SAP)

POLAROID CORPORATION, a global leader in instant imaging research, technology and products, has a need to fill a ***Group Information Management Manager (SAP)*** position. This Boston-area position will be responsible for leading the design and implementation of global business processes and SAP integrated software.

• Requirements include a Bachelor's degree in C/S, Math, EE, or similar field, and eight (8) years experience involving the design, development, implementation support of enterprise-wide, multi-functional information technology systems.

• Salary ranges from $87,768-$107,040, with two weeks paid vacation, medical insurance, and other industry competitive benefits.

Respond with resume only to: Ms. Natalie Perry, Manager HR, Global Resource Mgt., Polaroid Corp., 920 Winter St., (R1-1), Waltham, MA 02451. Fax: (781) 386-9540. Email: perryn@polaroid.com

Polaroid is an EOE-M/F/D/V/SO.

PROGRAMMER ANALYST - Must have BS in Computer Science or 2 years experience in job offered. Develop software requirements by analyzing various customer and internal specifications. Implement new software systems, automation of data transfer between systems using Excel, Access, SQL server (Data Transfer Services-DTS). Design, develop and customize software using FoxPro, Visual Basic, Microsoft FrontPage, SQL, Visual FoxPro database. Design, code and test plan reviews using company guidelines. Integrate software using version control tools for builds and releases using Visual Source Safe. Training of users of software that has been developed by software development team. 40 hours per week, 8:00 am to 5:00 pm. Salary $44,000 per year. Qualified applicants send resumes with social security to the Indian Department of Workforce Development, 10 N. Senate Ave., Indianapolis, Indiana 46204-2277, Attention: Mr. Gene Replogle. ID # 8078302.

PROGRAMMER ANALYSTS required for analysis, design and coding of mainframe based software applications using COBOL, CICS and DB2. Develop testing procedures and test strategy implementation. Maintain communications and interface applications with UNIX workstations.

Bachelor's required in Math, Computers, Engineering or any other related field of study plus 2 years of experience in the job duties described above. Must have proof of legal authority to work in the U.S.

Salary: $65,000.00/yr. for a 40 hour work week.

Interested applicants contact Carolyn Flanagan, Nebraska Job Service, 550 South 16th Street, P.O. Box 94600, Lincoln, NE 68509. Refer to Job Order No. NE0269688. Ad paid by An Equal Opportunity Employer.

Programmer Analyst. Plan, develop, test, and document computer programs/software to operate CNC controls and steel fabrication machinery using object oriented technology and component based software. Develop efficient software algorithms for the optimized performance of machinery testing and debugging of software. Bachelors degree required in Computer Science, Math or Electrical & Electronic Engineering plus two years of experience in the job offered or two years of experience in programmer/analyst computer work. Special requirements for this position include development/use with C++ and Windows NT platform development. 40 hours per week (7:30 a.m. to 4:30 p.m.) at $60,000 per year. Two positions open. To apply: contact the AR Employment Security Department, Benton, AR 309 S. East Street, or send resume to P.O. Box 2981, Little Rock, AR 72203, JO#0008956, attention David Hayes. Ad paid by an Equal Opportunity Employer.

Software Engineer for application development (batch and online systems), analysis, design, coding, optimization, system analysis, communication with the user, validation testing and quality assurance; develop & direct software system testing procedures, programming & documentation; table maintenance, system design review and production support. Software: ADW (Key 4.1 & 2.7-1), CICS, DB2, VSAM, FILE-AID, COBOL, JCL. Should be willing to travel on a project by project basis. Job is located in Boca Raton and various unanticipated locations throughout the United States. 40 hours week, 9AM-5PM, $65,000 per year. Master's/Foreign degree equivalent in Computer Engineering. In lieu of Master's/For. Deg. Equiv., will accept Bachelor's/For. Deg. Equiv. with 5 years progressive experience as programmer analyst. 2 years exp. in job offered. Send resume to: Dept. of Labor/Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302. RE: JOFL#2080387.

Programmer Analyst. Design, analyze and implement software applications, financial/accounting systems, report/table structures, database optimization using front end and back end tools. Demonstrated ability designing, analyzing, and implementing financial applications using Oracle. Demonstrated ability developing software using SQL, SOL *Plus, Stored procedures. Two years experience working with front end tools such as Forms 4.5, Reports 2.5, Developer 2000. $76,252/yr. 40 hr/wk. 9 a.m. - 5 p.m. Must have 5 yrs. exp. and B.S. in Comp. Sci, Eng., rel. field/equiv. Send 2 resumes: Case # 19992297, P.O. Box 8968, Boston, MA 02114.

SOFTWARE ENGINEER to design, develop, test, implement, and maintain application software for the telecommunications industry in a client/server environment using object oriented programming, C++, Visual C++, Roguewave Tools, CORBA, Shell Scripts, and Informix RDBMS under UNIX operating systems. Require: Master's degree in Computer Science, an Engineering discipline, or a closely related field, with two years of experience in the job offered; Extensive travel on assignments to various client sites within the U.S. is required. Salary: $68,000 per year, 9 am to 6 pm, M-F. Send resume to: Roz L. Alford, CEO, American Systems & Programming Co, Inc., 3885 Holcomb Bridge Road, Norcross,GA 30092 Attn: Job SK.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in ASP, Visual Basic and MS SOL Server. Requirements: Master's Degree or equivalent in Computer Science or related field and one year of experience as a software engineer or computer programmer, knowledge of ASP, Visual Basic and MS SOL Server. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. James Mackin, Beaver Falls Job Center, 2103 Ninth Avenue, Beaver Falls, PA 15010, Job No. WEB97938.

SOFTWARE ENGINEER - Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in ASP, Visual Basic and MS SOL Server. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of ASP, Visual Basic and MS SOL Server. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Ms. Margaret Weckerly, Butler County Job Center, 227 West Cunningham Street, Butler, PA 16003, Job No. WEB97941.

Renaissance offers a wide variety of positions for qualified software professionals. We offer both full-time salaried and hourly consulting positions, pre-tax medical insurance, paid vacation, 401(k), flexible spending accounts (FSA) and Employee Stock Purchase Plan (ESPP). Some positions may require higher levels of education and/or additional years of experience. For career opportunities in your area of expertise and specific Renaissance Worldwide office contact information, call our corporate Recruiting Center at: 1-800-248-9119; or visit our Web site at: www.rens.com. EOE.

Programmer/Analyst, Sr.
(2 positions)

35 hrs/wk; 9am-5pm; job located in Jacksonville FL/vicinity. $60,000 per yr. Bach degree in field of CompSci, Eng'g, or Math. + 2 yrs exp in job offered or 2 yrs exp in related occupation-P/A, Programmer &/or related EDP job title; Must have exp. w/: CDBDLII, MVS/JCL/util, CICS, VSAM, DB2; & possess good English language commun. skills. Analyze, design, develop, code, test & implement detailed batch & online EDP applic'ns with focus on complex modifications, enhancements, & testing of new & existing business applications, espec. for Year 2000 projects, in hi volume IBM mainframe environments under MVS (JCL/util) using CO8DLII, CICS, DB2, VSAM. Send resume to:
Dept. of Labor/Bureau of Workforce Program Support, PO Box 10669, Tallahassee, FL 32302; JOFL-2077017.

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is seeking individuals with experience in any of the following skills:

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- SEI-CMM, Process Improvement, SQA
- UNIX/Shell/Tools/Compilers/ makefiles
- C/C++, Perl, RDBMS, SOL
- Optics/Sonet, Switching
- LAN/WAN, TMN, CMIP/CMISE
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- SS7/OSI,DSP/RF/CDMA/TDMA
- Sales Executives & Technical Recruiters.

All positions require strong communication and interpersonal skills. We offer competitive salaries & a full benefits package to all employees. Please forward your resume to our recruiting department: mbarbera @softwareconfiguration.com or fax to: (732) 450-0715 attn: M. Barbera.

Programmer/Analyst, Sr.
(2 positions)

35 hrs/wk; 9am-5pm; job located in Jacksonville FL/vicinity. $60,000 per yr. Bach degree in field of CompSci, Eng'g, or Math. + 2 yrs exp in job offered or 2 yrs exp in related occupation-P/A, Programmer &/or related EDP job title; Must have exp. w/: CDBDLII, MVS/JCL/util, CICS, VSAM, DB2; & possess good English language commun. skills. Analyze, design, develop, code, test & implement detailed batch & online EDP applic'ns with focus on complex modifications, enhancements, & testing of new & existing business applications, espec. for Year 2000 projects, in hi volume IBM mainframe environments under MVS (JCL/util) using CD8DLII, CICS, D82, VSAM. Send resume to:
Dept. of Labor/Bureau of Workforce Program Support, PD Box 10869, Tallahassee, FL 32302; JOFL-2077028.

SOFTWARE ENGINEER

Multiple openings for software engineer's to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in IDMS, ADS/O and COBOL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of IDMS, ADS/O and COBOL. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Ms. Sue Notarnicola, Fayette County Team PA CareerLink, 32 Iowa Street, Uniontown, PA 15401-3513, Job No. WEB97945.

SENIOR SOFTWARE ENGINEER required. Design and development of systems architecture and applications software using IEF (Information Engineering Facility). Implement systems/software on mainframe platforms using COBOL, CICS and DB2.

Masters degree required in Math, Computers, Engineering or any related field of study plus three years of experience required in any occupation performing the job duties described above. Employer will accept a Bachelors degree plus five years of experience in place of the Masters and three previously mentioned. Must have proof of legal authority to work in the U.S.

Salary: $70,000/year for a 40 hour work week.

Mail two copies of resume and copy of ad to: Department of Labor, Licensing and Regulation, 1100 North Eutaw Street, Room #201, Baltimore, Maryland 21201, Job Order No. 9683042. Job Location: Gaithersburg, Maryland. Ad paid by an Equal Opportunity Employer.

Applications Engineer Operations Manager: Will be responsible for providing technical and sales support to company's field sales organizations. Will conduct training for Applications Engineers. Will aid the sales force with benchmarks and custom work on Pro/ENGINEER software products. Will improve the product knowledge and sales skills of the Applications Engineers. Will serve as the leader and focal point for Applications Engineers. Will assist in setting goals for the Applications Engineers. Requires a Bachelor's degree in Computer Science, Electrical/ Mechanical Engineering, Physics or Mathematics and 2 yrs in job offered OR 2 yrs experience developing CAD/CAM applications. Candidate must also possess demonstrated expertise programming in C or C++; and demonstrated expertise in UNIX and NT Operating Systems. Salary: $48,131/year. M-F 9am-5pm. *Must have proof of legal authority to work in the United States. Send your resume to the Iowa Workforce Center, 1700 S. 1ST Ave. Iowa City, Iowa 52244-2390. Please refer to Job Order IA1101046. Employer paid advertisement.*

Principal Software Engineer. Design, develop and implement Object Oriented solutions. Design, develop and implement Graphical User Interfaces (GUI) and design and develop applications using relational databases. Demonstrated ability designing, developing and implementing GUI based applications on Windows environments. Demonstrated ability working with C, C++, and Unix, and designing and developing applications using Sybase relational databases. 1 year experience developing applications using OPen Interface, and Visual C++. $76,252/yr. 40 hr/wk. 9 a.m. - 5 p.m. Must have 5 yrs. exp (or 5 yrs. exp. in related occupation of Software Engineer) and B.S. in Comp. Sci., Eng., rel. field/equiv. Send 2 resumes: Case # 19992218, P.O. Box 8968, Boston, MA 02114.

Software Engineer: Develop real-time signal processing algorithms on digital signal processors for speech coding and echo cancellation. Develop floating point C, integerize the model and develop assembly real-time software to execute on digital signal processing integrated circuits. 40hrs/wk, 9:00am – 5:00pm. $76,505/yr. Must have M.S. degree in Electrical Engineering or related field with a concentration in Signal Processing. Thorough knowledge of C and assembly languages; and MATLAB. Will train. Send 2 copies of resume to Case #19990893, PO BOX #8968, Boston, MA 02114.

SOFTWARE ENGINEER - Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in ASP, Visual Basic and MS SOL Server. Requirements: Master's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of ASP, Visual Basic and MS SOL Server. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Anthony Gebicki, Westmoreland County CareerLink, 300 East Hillis Street, Youngwood, PA 15697-1808, Job No. WEB97943.

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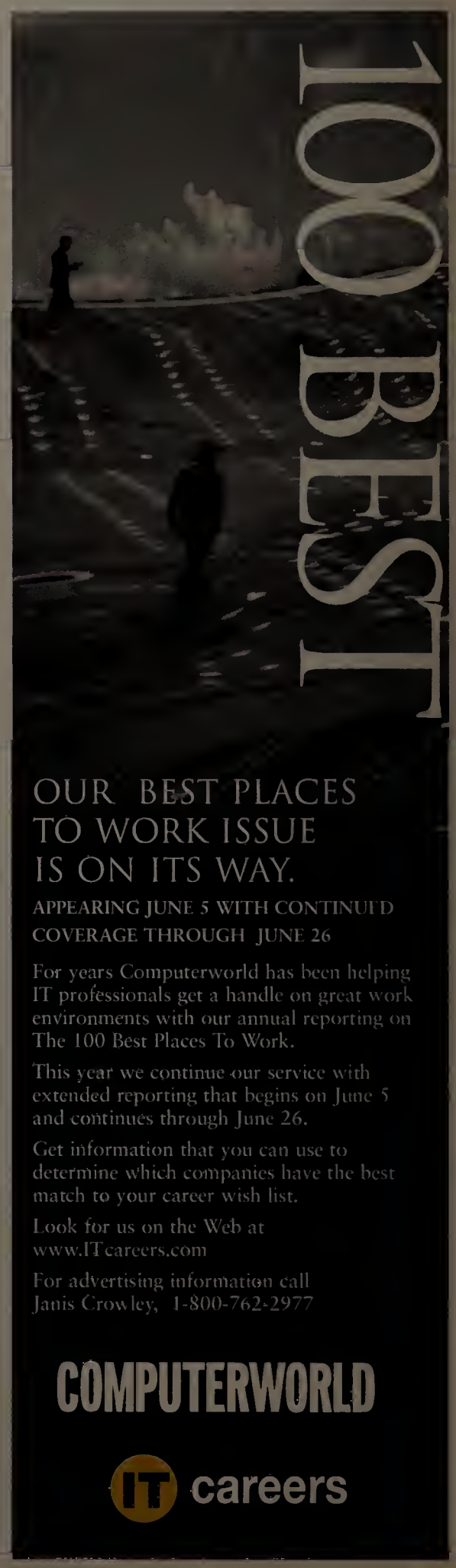

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IT careers

Software Consultant

Design & develop Real-Time embedded systems for firmware using C or Assembly language for processor based systems. Reqs: Bach. in Electronics or Engineering & 5 yrs. exp. M-F, 9AM-5PM, 35 hrs./wk., $72,500/yr. Send 2 resumes to: Case #19992280, PO Box 8968, Boston, MA 02114.

An International consulting firm is seeking: Programmer Analysts, Software Engineers and Database Administrators. Exp with a variety of hardware and software packages. We offer a competitive salary, commensurate rate with exp., plus a comprehensive benefit package, including 401K, health, dental and education assistance / reimbursement. Send resume to: Primesoft, LLC, One Lawson Lane, Burlington, VT 05401 Tel: 802-658-7600 /Fax: 802-658-1090 Email: Recruiting@primesoftgroup.com

Software Engineers - Several senior and entry-level positions available for qualified candidates possessing a BS/MS or equivalent and relevant experience. Work with Java, Oracle, Unix, C, and C++. Must be willing to travel and relocate as required. If interested, please send resume to Patel Consultants Corporation, 1525 Morris Avenue, Union, NJ 07083, ATTN: Human Resources.

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Full time Senior Project Engineer to design and create GUI (Graphic User Interface) with Visual C++/MFC(Microsoft Foundation Classes)/Object-Oriented C++ programming in Windows NT. Implement and maintain GUI's functions and additional features. Create system command functions/handlers for GUI's communicating with system engine, API and database to integrate the whole project. Must have a Master's Degree in Computer Science, or related field. Educational or work background must have included object oriented programming and Visual C++ 5.0/MFC. Salary: 59,775/yr. Send resume to: Electronic Tele-Communications, Inc., 3605 Clearview Place, Atlanta, Georgia 30340, Attn: Elaine McTyre.

Database Administrator - Berwyn, PA & various client sites Responsible for the design, implementation, testing and population of customer database. Perform data modeling, database systems architecture design as well as schema optimization and normalization. Must have: Proof of legal authority to work in US; Bachelor in Comp Sci or Engg plus 2 yrs of exp in job offered or as Programmer or Programmer Analyst or Systems Analyst (or Master with no exp); Exp. in Oracle RDBMS, PL/SQL, Pro*C. 40hrs/wk M-F 9am-5pm $67,800/yr Send resume or C.V. to The Philla. Job Bank, 444 N. 3rd St., FL., Phila, PA 19123 Job Order #7062712

SR. SOFTWARE ENGINEER: Debugging kernel and device driver and Develop test scripts in C, SQL and shell scripts; High availability concepts, GCOS, UNIX; TCP/IP, X.25, Compilers and good analysis and implementation of OS solutions; Oracle/Sybase database knowledge, basic internet knowledge and Windows NT and C++ skill. Job duties are to maintain and enhance system software with emphasis on operating system and communication protocols. Develop and maintain Internet based software. Requires Masters or equivalent in computer science with no experience required. 40 hours per week at $73,000 per year. Please send resume to Case # 19983662, PO Box # 8968, Boston, MA 02114

Software Engineer: Lead team in design & development of large commercial & government middleware to automate & interface hetrogeneous systems. M-F 40hrs/wk, 50K/yr. Must have BS in Systems Engineering & 5 yrs exp. as project leader for large network software development. Must be fluent in English, MS Visual C++, MFC, Windows NT, Oracle & Velosis, RDM, UNIX, SQL, Velosis, Visual Basic, PC Assembler, graphic & Internet tools. Send 2 copies of resume to Case # 19992471, P.O. Box 8968, Boston, MA 02114

Sr. Programmer Analyst: To analyze, dsgn, dev. & implement software applns. in accordance with client specification. Modify and/or enhance sys. capabilities by using various comp. languages & skills such as ORACLE. Visual Basic, Ms-Access on UNIX & Windows env. Sal. $65K+medical benefits. Must have MS in Computer Science/Engg or BS in Comp. Sc./Engg with 5 yrs of progressive exp. Send resume to Vice President, Koni Amen Tech Services, Inc., 5950 Live Oak Parkway, Suite 250, Norcross, GA 30093.

Design, implement Network Systems including intranet Network systems, provide Unix System Administration to Client computer systems, develop tools using Shell scripting and C language. Performance tuning of Unix and AIX operating systems and Oracle databases. Maintain system integrity, troubleshoot software & system problems in networked environment. Perform integration of AIX, Novell intraware, Windows NT & Windows operating systems. Install operating systems on servers and establish connectivity between servers. Must have Bachelor's of Computer SC./Equivalent & 6+ yrs. exp. as information technology professional in Unix administration. 2.5 + yrs. exp. in Shell Scripting, AIX, Windows NT, Network design and troubleshooting & C. 9 to 5 PM, 40 hrs. per week, $60,000 p.a., must have legal authority to work in the U.S. Send Resume attn. Som Bhattacharya, System Edge USA, LLC, 811 Seffert St., Philadelphia, PA 19128.

Software Engineers needed immed. by Boston-area company. Design, implemt, devlp & supprt co's proprietry sftwr systems for integrated contrl of air flow for critical air-qual. envirnmts, e.g. operating rms, manufactrs' clean rms, & resch labs. Coordinate sftwr devlmt w. co's embed. sftwr team. Create & encode, using objct orientd lang., algorithms for data transctn in LAN envirnmt using netwk protocls & digital sig. processing to process digitl data frm co's proprietary digitl hrdwr. Eval. sftwr sys. archtr. Anal. & imprve sys. perfrmnce. Devel. specs for sys. integratn. Ensure compat. betw. co's sftwr systems & other sftwr systems in major buildng managmt contrl systems. Reqrd: M.S. Elec. Engnr. or Comp. Engr; plus 1 yr. pre-or-post grad. exp. in job offerd OR 1 yr. pre-or-post grad. exp. in any occ. writing & encoding algorithms for digitl signl processing & for Visual C++ apps; plus demon. expertise in theory of Comp. Systms, Sys. Anal., & Digitl Sigl Processing as may be shown by grad. course wk, pubs, or prof. perform. 40 hrs/wk, M-F, 8am-5pm. Sal. $72,460/yr. Send resume (2 copies) to: Case Number 19990808, P.O. Box 8968, Boston, MA 02114. EOE

PROGRAMMER-ANALYST

F/T Position for person with BS degree in Computer Science or Information Systems and two years experience in the Computer industry with skills in **two** or more of the following areas: Mainframe/Midrange (COLBOL, CICS, AS/400), Client Server Application Development (VB, Visual C++, COAX/Optivision, Internet), SAP, UNIX, LAN/WAN, Networking/NT, Electronic Commerce/EDI, Data Architecture (SQL Server/Oracle). Job includes database changes to production & development environments; design and implement Oracle RDB Database strategy; provide Rdb and SQL server database support for industrial production and development; participate in application design reviews; redesign and re-engineer current applications and business practices. Proof of legal authority to work in US required. $62,690/yr. Job Order #GA 6495685. Report to or send 2 resumes to the nearest Georgia Dept. of Labor Field Service Office.

SOFTWARE ENGINEER: Experience in Unix based communication software to design, implement and test Network Management modules. Strong experience in UNIX systems, TCP/IP and Networking protocols; Demonstrated ability in Unix interprocess communication and socket programming; Demonstrated ability in UNIX/AIX shell programming; Demonstrated ability in working with C, C++ in AIX/UNIX environment. Requires: MS in Comp Sci, Engg, Electronics, Math or related field plus 2 years experience in job offered and or 2 years experience in software development; Will accept BS degree or foreign equivalent degree with five years of experience as computer professional, in lieu of the req'd edu. & exp. 40 hrs/wk, 8:00 a.m. to 5:00 p.m.; $70,000/yr. Send two (2) copies of resume/respond to: Case #19992420, PO Box 8968, Boston, MA 02114.

Software Engineer-Design, build, maintain, and enhance company product suite. Will utilize Microsoft Windows GUI methods to capture the information necessary to generate the simulation or workflow systems, extend the behavior and representation of business models, and translate research into actual simulations and workflow systems. Requirements include a Master of Science Degree in Computer Science, Software Engineering or related field and three years of pre or post degree experience in C/C++, Windows NT, Microsoft Visual C++, COM technology, and a thorough knowledge of workflow or simulation system. Applicants must have unrestricted authorization to work in the United States. Salary $72,500/year. 40 hours/wk. Respond with two copies of resume to Case #19990922, P.O. Box 8968, Boston, MA 02114.

Business Analyst. Software development business analysis. Deploy management information systems based on Groupware techniques. Knowledge analyzing software development business processes to create functional specifications for management information systems. Knowledge planning, structuring and administering heterogeneous computer networks for software development. Knowledge to create and develop management information systems or business applications using Groupware technology $82,202/yr. 40 hr/wk. 9 a.m. - 5 p.m. Must have Master's degree in Business Mgmt. rel. field/equiv. Send 2 resumes: Case #19992275, P.O. Box 8968, Boston, MA 02114.

Systems Analyst (GIS) Miami, FL: Operate, maintain and enhance Geographic Information Systems (GIS) software. Data capture, acquisition, correlation and analysis using electronic instruments and computer systems. Will supervise 1 employee. Req'd Bachelor's degree in Comp. Sc., Math, Physics or Astrophysics & 1 yr of exp. in the job duties or in a related occupation in Math, Comp. Software development. Astronomy/Astrophysics. M-F 7:30 a.m.-3:30 p.m. 40 hrs/wk. $47,424/yr. Send resume to: Dept of Labor/Bureau of Workforce Program Support P.O. Box 10869, Tallahassee, Florida 32302-0869. JOFL 2080550.

Software Engineers
Clifton, NJ

Automated Wagering International, Inc. designs and manufactures on-iine lottery systems and terminals, and provides operations. marketing support and game development to lotteries. With nearly three decades of experience, AWI has built a reputation as a technological innovator and market leader.

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You must possess a BA/BS in Computer Science, Engineering or related field and 0-4 years of applications development experience. Skills sought include C and Assembly.

Please submit resume and salary requirements in confidence to: Employment, AWI, 1255 Broad Street, Suite 200, Clifton, NJ 07013-4219 or fax to (973) 594-0562. Visit us on the web at: www.awii.com.

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Senior Software Engineer: Responsible for all phases of system development including Requirement Definition, Functional and Technical Design, Development, Software Testing and implementation of ERP and ECOM products. Design complex business applications using Object Oriented Methodologies, Object Request Broker and other distributed processing tools on the multi-tier cross platform environments. Implement ECOM/ERP solutions using the following technologies: VC++, MFC, JAVA, JFC, SERVLETS, COM, CORBA, JDBC, ODBC, ORACLE, SQL-Server on Windows NT and UNIX platforms. Provide leadership for enhancing and recommending solutions for existing applications, technical user and configuration documents and product technical support. Requires: advanced degree of an M.S. in Computer Science or related field or in the alternative a B.S. followed by 5 years of progressive job related experience. 40 hrs/wk (8 to 5) $75,000/yr. Send two (2) copies of resume/response to Job Order # 2000-209, P.O. Box 989, Concord, NH 03302-0989.

Technical Specialist

Technical Specialist I

AAA is seeking a Technical Specialist to join our growing team in Heathrow, Florida. Candidate will identify, analyze, and define requirements, procedures, and problems and devise solutions; design, code, test, debug, and document computer programs; contribute to development through integration and maintenance of highly complex system software and databases; may instruct, direct, and check work of programming personnel. A Bachelor's degree in Computer or Engineering field is required, along with two years of experience in programming and systems analysis with proficiency in Visual C++ and Informix. For consideration, please send your resume to be received in our office by June 5, to: AAA, Human Resources, Dept. 70TS, 1000 AAA Drive, Heathrow, FL 32746-5063. Fax 407-444-7504. Check us out on the web at www.aaa.com/jobs. EOE M/F/D/V.

AAA

Software Engineers

IRIS Associates, the creator of Lotus Notes, Lotus Domino and Lotus Domino Designer, seeks to fill a number of Software Engineering positions at various levels of responsibility at our location in Westford, MA.

All positions require a BS degree (or equivalent) in Computer Science or other relevant field, together with at least 4 to 7+ years' relevant experience.

Senior Software Engineer (QuickPlace Internals)

• XML/SSL processors in Java and C++

Principal Software Engineer (Notes Client Editor)

• HTML & Int'l. char. processing/bi-directional

Principal Software Engineer (Lotus-Iris Products Designer/Server Administration)

• Visual Design, Product Mgt., Int'l. Products

Project Manager (Domino Web Engine)

• Multiplatform, HTML, DHTML, Javascript

Numerous Other SWE Positions/Levels

• Software Design, Coding, and Testing

Competitive benefits and starting salaries from $57,250-$102,600, commensurate with the position's specific responsibilities, accompany this exciting high-tech environment growth opportunity.

Please mail or fax your resume, indicating Reference Code "IMSP," to: Iris Associates, Attn: Human Resources, Five Technology Park Drive, Westford, MA 01886; Fax: 978/392-6060. Email: Irisimspjobs@iris.com

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Microcomputer Support Specialist (Orlando, FL). Install, modify, & make minor repairs to microcomp h/ware & s/ware systems & provide tech'l assistance & training to systm users: Inspect microcomp eqpmt & read order sheet listing user reqmts to prep microcomp for delivery. Install or assist service personnel in installation of h/ware & peripheral components, such as monitors, keyboards, printers & disk drives on user's premises, following dsgn or installation specs. Load specified s/ware packages, such as operating systms, word processing, or spreadsheet prgms into comp. Enter commands & observe systm functions to verify correct systm operation. Instruct user in use of eqpmt, s/ware & manuals. Answer client inquiries in person & via telephone concerning systms operation; diagnose systm h/ware, s/ware & operator probs & recommend or perform minor remedial actions to correct probs based on knowl of systm operation. Replace defective or inadequate s/ware packages. Refer major h/ware probs to service personnel for correction. Attend tech'l conferences & seminars to keep abreast of new s/ware & h/ware product dvlpmts. Bach in Comp Sci or equiv exp w/HP PC's, netservers, printers & notebooks; Compaq servers, printers & notebooks; Fujitsu printers & notebooks; & Novell & MS networking operations. $42,524 /yr. $31.91 OT; 40 hrs/wk during normal business hrs, 8:30a-5:30p, M-F; 5 hrs OT/wk. Resume to: FDLES Bureau of Workforce Prgm Support, PO Box 10869, Tallahassee, Fl 32302-0869. JO# FL2080365.

Senior Programmer - To work on various software projects for business and/or technical systems using Windows API, OCX, OLE, DLL, COM/DCOM, MFC, and AT1. To derive detail design specifications and development schedules from high level architectural documents, and to analyze, design, develop computer software using object oriented methodology. To perform structured systems analysis; design program's software structure for the responsible portion of the project; write technical specifications; plan development schedules; review periodicals, publications, and documents; develop software using Visual C++, Visual Basic on Windows Platform; use client service databases such as Microsoft SQL Server; test and debug software; assure quality of the software; implement and integrate systems according to the systems specifications; maintain and support computer systems; and write documentation and user manuals for the developed systems. Must have a Master's degree or equivalent (BS plus five years of experience) in computer science, engineering or related field with two years of experience in the offered poistion or in programming or software development. 40 hrs/wk: $75,000/yr: 9 am to 5 pm. Send two resumes to Case # 19992112, P.O.Box 8968. Boston, MA 02114.

BOSE Corporation, an innovative leader in consumer electronics and acoustics, has an immediate need to fill a range of SAP, EDI and Sales Systems Support positions in the Boston area.

The following positions all require a Bachelor's degree (or equivalent) in Computer Science, MIS, Business Administration, or similarly relevant field, and 2-6 years relevant experience to include the requirements described below.

PROGRAMMER-ANALYST POSITIONS

- Sap Basis Administrators (with SAP experience, involving both Oracle and HP-UX and protocols, in a production environment.)
- EDI- Sales Systems Support Programmer/Analyst (with EDI mapping and HP-UX scripting experience, in a production environment.)

Starting salaries range from $47,100 to $82,600 per year, together with two weeks annual paid vacation, medical and life insurances, and other industry-competitive benefits.

Please mail or fax your resume to: Mr. Donald Baptiste, (IMSP), Bose Corporation, Dept. 5-D-1, The Mountain, Framingham, MA 01701. Fax (508) 766-7499. Email: don.baptiste@bose.com. Visit: www.bose.com

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Systems Analysts-Multiple positions

Responsibilities: Analyzes users requirements, procedures, and problems to improve existing computer system. Confer with the client/server quality assurance team in analyzing software from product inception to release. Help develop and execute test plans and test procedures. Recommend corrective actions. Analyze and report test standards, procedures and results and maintain quality standards using UNIX, Oracle, SQL Server, CORBA, DCOM or UML and

Responsibilities: Analyzes users requirements, procedures, and problems to produce ecommerce product with effective strategies for development, marketing, sales and support. Analyzes test data and designs methods and procedures for obtaining data. Conducts studies pertaining to development of programs to increase sales, monitor lead generation and tracking and develop and maintain customer contacts.

B.S. or foreign degree equivalent in computer science, engineering or related field; 1 year experience in job offered or 1 year as quality assurance engineer or software engineer with experience in C/C++ programming. $54,000/year. Location of job, Denver, Colorado. 40 hr. week. Application by resume only. Submit two (2) copies of resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to job order number C04658157.

Member of Technical Staff. Duties: Provide strategic/technical assistance to the business and service units of telecommunications company. Use knowledge of voice systems including those of AT&T and Siemens, and network technologies including Ethernet, Token Ring, TCP/IP, NICs, hubs, bridges, switches, routers, Frame Relay, ATM, Windows NT and Novell Netware to perform technology/competitive intelligence, Assess new technologies & relate them to business/service opportunities. Translate technology impacts to both technical and non-technical audiences. Develop conceptual ideas on new products by leading ideation sessions or otherwise. Analyze technical and/or service feasibility of new product/service concepts, and subsequently develop proof-of-concept scenarios and prototypes for those concepts; utilize vendor management skills and industry knowledge to evaluate vendors and their platforms/products, in order to aid the business in bringing a concept to product deployment. Use project management skills to develop and track project plans, and/or assist with financial management of other specific projects. Requires: B.S. Computer Science or related, plus working knowledge and/or coursework in the following: (1) Performance of technology intelligence and assessments (2) Ethernet, Token Ring, TCP/IP, NICs (3) Hubs, bridges, switches, routers, Frame Relay & ATM (4) Windows NT, Novell Netware (5) AT&T and Siemens voice systems. Location: Boulder, CO. Working Conditions: M-F 8a.m.-5p.m. Salary: $59,900/yr. Reply by resume only to Colorado Department of Labor & Employment, Employment Programs, Attn: Jim Shimada, Tower 2, Suite 400, Arapahoe Street, Denver, CO 80202-2117 and refer to job order number: CO4657965.

Senior Software Consultant sought by company in Denver, CO specializing in business software solutions to work in Costa Mesa, CA & other unanticipated job sites in the US. At a senior level, implement client/server manufacturing enterprise resource planning software applications. Analyze manufacturing processes used by the client company & create specifications for customized manufacturing ERP software applications. Implement & install the software applications & customize, enhance, & modify the applications to be consistent with the client's manufacturing processes. Engage in the re-engineering of those processes to increase the efficiency of the software applications. Trouble shoot & resolve any problems or bugs. Provide technical support of other Software Consultants. Requires Master's or equivalent-specifically, requires a Master's degree (or foreign equivalent) in comp. sci., eng., or related field (incl. ind. eng. or eng.(prod.))+ 3 years of progressively more responsible manufacturing &/or software experience; or, a Bachelor's degree (or foreign equivalent) in comp. sci., eng., or related field (incl. ind. eng., or eng.(prod.) + 5 years of progressively more responsible manufacturing &/or software experience; Working knowledge of implementing & customizing manufacturing ERP software applications. 8am-5pm, M-F; $68,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, CO 80202, & refer to Job Order #CO4659274

Team Leader sought by company in Denver, Co specializing in business software solutions to work in Norwalk, CT & other unanticipated job sites in the US. Lead a team of technical consultants who are involved in implementing, integrating, & customizing client/server enterprise resource planning software applications, including acting as a Project Leader. The software applications run on Windows NT & UNIX platforms, & interface with different relational database management systems, including Oracle, Sybase, & SQL Server. Engage in business process re-engineering & plan direction of future releases. Assign tasks & provide technical direction & support to Technical Consultants & Senior Technical Consultants who create designs & design documentation, & code, test, & de-bug the software customizations. Use Shell Script, Perl Script, & TCL Script in designing, & developing the customizations. Work with reseerch & development to customize core software applications. Requires Master's in comp. sci., eng., or related field (incl. ind'l eng.); 1 yr. as a technical consultant implementing & customizing enterprise resource planning software applications that run on Windows NT & UNIX platforms, & interface with relational database management systems. 8am-5pm, M-F; $60,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659311.

Senior Consultant sought by company in Denver, CO specializing in business software solutions to work in Beaverton, OR & other unanticipated job sites in the US. Implement client/server manufacturing enterprise resource planning (ERP) software applications & modules. Design & develop modified & customized client/server manufacturing ERP software applications. Engage in extensive testing of the manufacturing software applications, & problem solve & trouble shoot any bugs or issues. Analyze business processes to make sure the software applications & modules are consistent with those business processes. Use business modeling tools to link software applications & modules with existing business processes. Requires Master's or equivalent-Specifically, a Master's (or foreign equivalent) in computer science, engineering, or a related field (including mechanical engineering)+three years of progressive experience in manufacturing &/or software development, or a Bachelor's (or foreign equivalent in computer science, engineering, or a related field (including mechanical engineering)+ five years of progressive experience in manufacturing &/or software development; Working knowledge in the design, development, & implementation of client/server manufacturing ERP software applications. 8am-5pm, M-F; $88,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order # CO4659293.

Sr. Software Testing Engineer sought by computer consulting company in Greenwood Village, CO, to work in Greenwood Village, & other unanticipated job sites in the U.S., to, at a senior level, conduct testing, configuration management, verification & validation, & quality assurance of new or updated software applications for client/server products. Create, implement, & maintain test plans, test design documents for products & software. Create automated test cases using automated testing tools & product test result reports. Monitor the reported bugs, work with the development team to determine schedule for resolution, retest & resolve the bugs/defects. Participate in product requirement & system requirement specification reviews. Provide LOE & schedule for testing efforts. Engage in version controlling & bug reporting using Continuous/RCS/CVS/PCRM/Gnats/DDTS tools. Participate in formulization & implementation of SEI/CMM key process areas to assure certain 'maturity' level of standardization, & also engage in external & internal quality audits, generation of audit reports, minutes & action items. Requires Master's or equivalent in Computer Science or related field. Specifically, the position requires a Master's or foreign degree equivalent, plus 3 yrs of progressive experience in the software field, or a Bachelor's, or foreign degree equivalent, plus 5 yrs of progressive experience in the software field. Working knowledge of creating automated test cases, configuration management tools, & implementing SEI/CMM key process areas. $66, 100/yr; M-F; 8am-5pm. Respond by resume to James Shimada, CO Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4659237.

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Senior Technical Consultant sought by company in Boulder, Co to work in Boulder & other unanticipated job sites in the U.S. At a senior level & for a computer consulting company specializing in providing business solutions to middle market clients & that has been selected as an SAP National Implementation Partner, use Oracle-based Tier One ERP (Enterprise Resource Planning) systems to provide clients with a thorough business needs analysis, product configuration, connectivity & requirement definition, documentation, & identify & recommend areas for procedural change. Install & configure multiple versions of UNIX & NT operating systems, Oracle &/or SQL/Server RDBMS; install and configure complete SAP R/3 systems & landscapes. Give internal and external training on SAP R/3 support & installation. Provide tuning services & install add-on products such as Crystal Reports. Set up & maintain the security & transport systems as well as back up & recover processes. Requires Master's or foreign equivalent in computer science or related field (incl. Computer applications); 2yrs. exp. programming in a Tier One Oracle-based ERP system. 8am-5pm, M-F; $78,000/yr.(4 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400,1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659582.

Software Engineer sought by company in Lakewood, CO that is a non-bank provider of customer money transfer & other financial services to work in Lakewood & other unanticipated job sites in the US. Design & develop software to facilitate consumer money wire transfers. Using UML & object-oriented analysis, interface with the users to determine requirements & develop an object-oriented design. Implement the design using object-oriented programming, Java & Swing on the NT operating system for a multi-tier client/server environment. Responsibilities include developing software design, implementing designs as code, testing software implementation, maintenance enhancements & troubleshooting. Requires Bachelor's or foreign equivalent in comp. sci., eng., or related field (incl. civil eng. w/coursework in comp. sci.); 4 yrs. exp. as a software engineer, w/at least 2 yrs using object oriented analysis, design & programming, & at least 2 yrs. using Java, working knowl of UML (Unified Modeling Language) & Swing. 8am-5pm, M-F; $75,000/yr. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Towerll, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4658916.

Senior Technical Consultant (Operations Research Analyst) sought by company in Denver, CO specializing in business software solutions to work in Norwalk, CT & other unanticipated job sites in the US. At a senior level, implement, integrate, & customize client/server enterprise resource planning software applications, including acting as a project leader. The software applications run on Windows NT & UNIX platforms & interface with different relational database management systems, including Oracle, Sybase, & SQL/Server. Engage in business process modeling, optimization & re-engineering. Create software designs & design documentation, & work with software engineers to customize & implement core software applications & plan direction of future releases. Requires Bachelor's in comp. sci., eng., or related field (incl. operations research); 1 yr. as a technical consultant implementing & customizing software applications that run on Windows NT & UNIX platforms, & interface with relational database management systems, & engaging in business process modeling, optimization & re-engineering. 8am-5pm, M-F; $66,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order # CO4659265.

Senior Technical Consultant sought by company in Denver, CO specializing in business software solutions to work in Atlanta, GA & other unanticipated job sites in the US. At a senior level, implement, integrate, & customize client/server enterprise resource planning software applications, including acting as a project leader. The software applications run on Windows NT & UNIX platforms, & interface with different relational database management systems, including Oracle, Sybase, & SQL/Server. Engage in business process re-engineering. Create designs & design documentation, & code, test, & de-bug the software customizations. Use Shell Script, Perl Script, & TCL Script in designing & developing the customizations. Work with research & development to customize core software applications. Plan direction of future releases. Requires Bachelor's in comp. sci., eng. or related field (incl. ind'l eng./mgt.eng.); 2 yrs. as a technical consultant implementing & customizing software applications that run on Windows NT & UNIX platforms, & interface with relational database management systems. 8am-5pm, M-F; $73,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, # 400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659300

STAFF CONSULTANT. Houston area company with 16 branch offices located throughout the U.S. which provides computer software consulting services seeks Staff Consultant. This job pays $61,000.00 per year with no overtime. The job requires the employee to perform computer systems analysis and software development including analysis, design, development, and implementation of programs for computer-based information systems in the capacity of a computer programmer-analyst; evaluate program needs of users to determine feasibility, costs, and time required; consult with users to identify operating procedures and program objectives; formulate a plan and outline steps required to develop program, using structured analysis and design; convert specifications into instructions and logical steps for coding, applying knowledge of programming techniques and languages; enter program codes into computer system; and, run and test program for logic and syntax errors to correct code. Requires a Bachelor's Degree in Computer Science and 1.5 years of experience as a Staff Consultant. Acceptable alternative Bachelor's Degrees include majors in Applied Mathematics, Applied Science, Information Systems, Engineering, Business Administration or Computer Technology, and 1.5 years of experience as a Programmer-Analyst, Staff Consultant, Junior Staff Consultant, or combination. The area of employment is Colorado Springs, Colorado. Application is by resume only. Must have proof of legal authority to work in the U.S. Mail resumes to: Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117, and refer to order number CO4659039. Ad Paid by An Equal Opportunity Employer.

Consultants - Several senior and entry-level positions available for candidates possessing a MS/BS or equivalent. Work with SQL, Visual Basic, Web (HTML, Java) and TCP/IP. Must be willing to travel and relocate as required. Send resume to Perspectus, Inc., 3240 Lyon Street, San Francisco, CA 94123.

Implementation Consultant

Management Reports, Inc., the preferred provider of Real Estate asset and property management software, currently has an opening for an Implementation Consultant, working in various California locations.

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Management Reports, Inc.

Senior Programmer/Analyst sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. At a senior level, engage in full life-cycle development of computer software applications that run on IBM AS/400 platform using the programming language RPG/400. Analyze requirements. Create design & design documentation. Code, test, & de-bug the software applications. Mentor other programmer/analysts. Requires Master's or foreign equivalent in comp. sci. or related field (incl. mathematics); Working knowledge of designing & developing computer software applications that run on IBM AS/400 platform using programming languages RPG/400. 8am-5pm, M-F; $60,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659301

Systems Engineer sought by company in Louisville, CO that manufactures computing storage devices to work in Louisville & other unanticipated sites in the US. Provide worldwide systems engineering support, primarily in a pre-sales context, for capacity planning & performance tuning of hierarchical disk & tape storage devices & their applications. Develop benchmarks & advise clients on hardware, software, & applications in an MVS environment. Assist in the development of & use analytical software tools to analyze the technical needs of clients & to design & develop large storage systems for mainframe computers. Write white papers for customers & other employees in the field of new technologies & products. Also assist in the identification & solution for post-sale problems. Requires 2 yrs. as a systems engineer involved in setting benchmarks & in capacity planning & performance tuning in the MVS environment within a tape & disk storage hierarchy. 8am-5pm, M-F; $63, 435/yr. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659505

Programmer/Analyst sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. Under close supervision, engage in moderately complex tasks regarding the design & development of client/server software applications that interface a variety of relationel database management systems. Analyze requirements. Create designs & design documentation. Code, test, de-bug & implement the software applications. Use proprietary case tools & programming language C in the design & development process. Requires Bachelor's in comp. sci. or related field (incl. bus. admin. W/emph. in MIS); Working knowledge of design, development, coding, testing, de-bugging & implementing of client/server software applications that interface with relational database management systems (working knowledge may be gained through employment or in an academic setting). 8am-5pm, M-F; $46,500/yr. (2 openings) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, # 400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659306

Software Engineer sought by company in Farmington Hills, MI that develops software & provides professionel services to work in Colorado Springs, CO & other locations in CO. Engaged in full life cycle software development. Develop custom software applications which incorporate client/server architecture & Oracle relational database management systems, & run on Windows NT Operating Systems. Analyze requirements. Create designs & design documentation. Code, test & debug the software applications. Train users & troubleshoot as needed. Use Visual Basic, C++, SQL Server, ASP & Com/D-Com in the design & development process. Requires Bachelor's or foreign equivelent in comp. sci. or eng. (incl. mech'l eng.); 2 yrs developing software for Windows operating systems including utilizing Visual Basic, C++ & SQL Server; Working knowledge of Oracle relational database management systems & Com/D-Com. 8am-5pm, M-F; $68,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order Number CO4659675.

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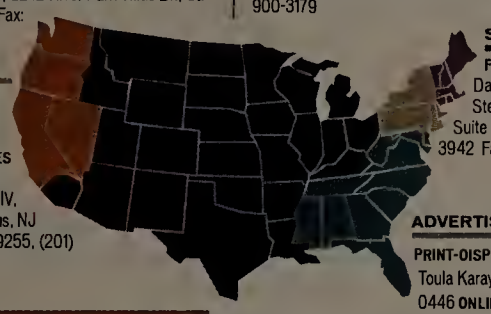

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Network General	8.8

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Hughes Electronics/GM	7.69
Documentum	7.25
Xilinx	5.44
Intuit	4.88
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NCR	4.19
Computer Sciences (H)	3.81

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Tricord Systems	-23.3
eToys Inc.	-23.0

DOLLAR	
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Yahoo Inc.	-12.13
Teradyne	-11.19
Advanced Micro Devices	-11.06
NEC	-10.69

Market Correction Pulls Down Cisco

But analysts say firm's fundamentals still strong

BY LEE COPELAND

ON MARCH 27, the stock price for Cisco Systems Inc. [Nasdaq:CSCO] hit $80 per share, blasting the market valuation of the network infrastructure firm past that of software giant Microsoft Corp. [Nasdaq:MSFT] for the first time. But since that high point just two months ago, Cisco shares have zigzagged downward, losing more than one-third of their value.

INDUSTRY ALMANAC

Analysts said the March market correction, which hit technology issues particularly hard, triggered Cisco's slide.

"The [lowered] stock value is more market-related than Cisco-related," said John Bowen, a financial analyst at FAC/Equities, the investment wing of First Albany Corp. [Nasdaq:FACT] in Albany, N.Y. "In general, the market is penalizing companies that had very high valuations. Cisco has always had a high valuation, but it's been higher than normal in recent months."

Bowen added that because the fundamentals of San Jose-based Cisco remain solid, the company has been able to avoid a more drastic rollback in value.

Other network infrastructure hardware firms took much worse beatings in the market-correction crunch. Juniper Networks Inc. [Nasdaq:JNPR] in Mountain View, Calif., closed at $169 per share on May 22, down from a 52-week high of $312.94 on March 29. Sycamore Networks Inc. [Nasdaq:SCMR] in Chelmsford, Mass., has endured a stock market roller-coaster ride, dropping from a 52-week high of $199 on March 2 to a 52-week low of $47.25 on April 17. The stock closed at $80 last Monday.

Of the 42 financial analyst firms that made recommendations on Cisco's stock, 62% rated the stock a Strong Buy, while 33% deemed it a Buy. Only two analysts suggested that investors should merely hold on to the issue.

One of the analysts who downgraded Cisco to a Hold said the stock's value rose ahead of expectations.

"Even a solid foundation cannot support a building with a thousand stories," said Dave Powers, a financial analyst at Edward D. Jones & Co. in St. Louis. "And that's what Cisco was in late March."

He added that rising interest rates and inflation have also caused concern.

Most technology firms don't take on debt, which means rising interest rates don't affect corporate operations, he explained. However, their customers may cut back capital expenditures normally financed by debt, which could negatively affect revenue streams. ◗

Cisco's Decline

Cisco's week-by-week closes since March 27:

SOURCE: NASDAQ STOCK MARKET INC., NEW YORK

EXCH	52-WEEK	RANGE		MAY 26 2 PM	WK NET CHANGE	WK PCT CHANGE
SOFTWARE OFF -3.1%						
A5WX	149.12	11.00	Active Software (H)	28.63	-4.13	12.6
AOBE	131.00	30.81	Adobe Systems Inc.	103.50	-8.75	7.8
ARBA	183.34	15.25	Ariba Inc.	51.13	-7.88	-13.3
AZPN	55.37	8.12	Aspen Technology Inc.	19.94	-3.69	-15.6
ADSK	56.06	17.00	Autodesk Inc.	35.66	-1.91	-5.1
AVID	25.56	9.43	Avid Technology	10.31	-0.69	-6.3
BAANF	17.81	1.12	Baan Co. N.V. (L)	2.56	1.13	78.3
BMC5	86.62	36.00	BMC Software Inc.	42.06	-0.94	-2.2
BOBJ	150.87	11.06	Businesss Objects S.A.	73.25	-0.75	-1.0
CDN	24.62	9.18	Cadence Design Systems	14.00	-0.50	-3.4
CHKP	295.00	16.62	Checkpoint Software Tech. Ltd.	156.94	-7.06	-4.3
CTX5	122.31	20.18	Citrix Systems Inc.	45.94	-2.88	-5.9
COGN	41.12	9.68	Cognos Inc.	32.69	1.75	5.7
CA	79.43	40.93	Computer Associates Int'l Inc.	50.69	0.81	1.6
CPWR	40.00	9.25	Compuware Corp. (L)	9.47	-1.09	-10.4
OCTM	106.00	12.18	Documentum	49.00	7.25	17.4
EFII	69.31	35.00	Electronics For Imaging	42.13	-6.31	-13.0
HNCS	130.00	18.00	Hnc Software	38.25	-2.25	-5.6
HYSL	65.00	12.00	Hyperion Software	26.19	0.13	0.5
IDXC	49.12	14.06	IDX Systems (L)	15.25	-0.69	-4.3
INFA	110.87	9.50	Informatica Corp.	40.75	1.38	3.5
IFMX	21.25	6.03	Informix Software Inc.	6.66	-0.88	-11.6
INTU	90.00	22.50	Intuit	32.63	4.88	17.6
JKHY	41.31	15.50	Jack Henry Associates	39.06	1.19	3.1
JOEC	48.31	10.25	J.D. Edwards & Co. (L)	11.81	-1.38	-10.4
LGTDE	82.50	9.94	Legato Systems Inc. (H)	9.94	-1.50	-13.1
MACR	100.00	27.37	Macromedia Inc.	78.00	-0.25	-0.3
MANU	70.25	7.50	Manugistics Group Inc.	29.25	-0.13	-0.4
MENT	18.50	7.75	Mentor Graphics	16.50	0.00	0.0
MSFT	119.93	61.00	Microsoft Corp. (L)	61.00	-3.88	-6.0
NETA	37.18	11.62	Network Associates	20.19	-0.69	-3.3
GMH	140.00	48.75	Network General	94.75	7.69	8.8
NOVL	44.56	7.93	Novell Inc. (L)	7.94	-1.00	-11.2
ORCL	90.00	11.28	Oracle Corp.	65.94	-4.25	-6.1
PMTC	35.93	7.37	Parametric Technology Corp.	8.00	-1.03	-11.4
PSFT	27.75	12.00	PeopleSoft Inc.	13.31	-1.75	-11.6
PIXR	50.62	33.12	Pixar	33.69	-3.63	-9.7
RATL	105.00	26.37	Rational Software Corp.	68.75	-5.25	-7.1
RHAT	151.31	7.00	Red Hat Inc.	18.13	-2.81	-14.9
QSFT	98.12	7.00	Quest Software	38.13	-2.25	-5.6
SAP	85.93	29.37	SAP AG	42.00	0.88	2.1
SCUR	29.62	2.25	Secure Computing Corp.	10.75	-1.25	-10.4
SDRC	23.43	8.81	Structural Dynamics Research	11.38	-0.75	-6.2
SYBS	31.00	7.12	Sybase Inc.	18.75	-2.44	-11.5
SYMC	81.62	17.75	Symantec Corp	62.44	-0.63	-1.0
SNPS	75.62	36.87	Synopsis	41.88	-2.13	-4.8
SCTC	28.37	10.00	Systems & Computer Technology	17.75	-1.63	-8.4
TIBX	147.00	5.00	Tibco Software Inc.	51.50	-5.25	-9.3
TSAI	48.12	12.00	Transaction Sys. Architects	12.00	-2.13	-15.0
VRTS	174.00	15.05	Veritas Software Corp.	105.50	4.69	4.6
WIND	66.12	13.37	Wind River Systems Inc.	32.44	-3.56	-9.9
TELECOMMUNICATIONS CARRIERS OFF -3.1%						
AT	91.81	55.87	Alltel Corp.	60.50	-1.19	-1.9
ANDW	35.06	11.18	Andrew Corp.	33.13	-0.25	-0.7
T	63.00	33.62	AT&T (L)	35.00	-1.00	-2.8
BCE	137.50	21.06	BCEInc. (L)	21.69	-0.75	-3.3
BEL	69.50	47.37	Bell Atlantic	52.13	1.25	2.5
BLS	53.50	34.93	Bell South	47.31	1.19	2.6
BRW	41.06	16.31	Cincinnati Bell Inc.	24.00	-1.88	-7.2
CMCSK	57.68	27.87	Comcast (L)	31.56	1.56	5.2
CQ	37.06	15.37	Comsat Corp.	24.06	0.38	1.6
CDX	58.37	33.37	Cox Communications Inc.	39.25	-1.81	-4.4
GSTRF	53.75	7.87	Globalstar Telecom. Ltd.	9.00	-0.94	-9.4
GTE	78.50	55.81	GTE Corp.	82.00	1.31	2.2
NXTL	165.87	33.00	Nextel Communications	81.50	-14.25	-14.9
SPDT	74.25	29.00	Panamsat	42.63	3.75	9.6
QCOM	200.00	21.51	Qualcomm	63.25	-26.81	-29.8
SBC	59.87	34.81	SBC Communications	42.94	0.06	0.1
FDN	75.93	42.62	Sprint Corp.	57.31	2.38	4.3
TOS	137.00	59.75	Telephone and Data Systems	102.94	0.31	0.3
USW	81.50	51.50	US West	71.00	-1.13	-1.6
VIA	63.31	36.68	Viacom	56.50	-2.75	-4.6
WCII	66.50	24.00	Winstar Communications Inc.	26.63	-4.63	-14.8
WCOM	64.51	35.87	MCI Worldcom Inc. (L)	37.56	-0.19	-0.5
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AC5	53.00	31.00	Affiliated Computer Servs	33.00	-1.75	-5.0
AMSY	44.37	19.75	American Mgt. Systems	36.13	0.44	1.2
AUD	56.25	37.37	Automatic Data Processing (H)	53.44	2.44	4.8
BSYS	69.00	41.37	Bisys Group Inc.	59.00	-0.09	-0.2
CATP	27.00	7.25	Cambridge Technology Ptnrs (L)	7.25	-2.00	-21.6
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CBR	29.81	13.75	Ciber Inc.	15.50	-0.81	-5.0
CDO	57.25	17.43	Comdisco	25.38	-3.25	-11.4
CHRZ	27.12	10.37	Computer Horizons Corp.	10.81	-0.69	-6.0
CSC	96.37	57.31	Computer Sciences (H)	89.38	3.81	4.5
DST	76.43	51.18	Dst Systems Inc.	71.81	3.50	5.1
EDS	76.68	47.87	Electronic Data Systems	62.00	1.94	3.2
FDC	54.81	38.93	First Data Group (H)	50.88	1.75	3.6
FISV	46.81	24.12	Fiserv	42.06	0.94	2.3
IT	24.93	9.56	Gartner Group Inc.	12.31	-0.13	-1.0
KEA	35.00	18.06	Keane	26.69	0.31	1.2
NOC	52.06	21.75	National Data	22.13	-1.00	-4.3
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PER	33.62	15.00	Perot Systems Corp. (L)	15.25	-0.31	-2.0
REGI	9.75	1.75	Renaissance Worldwide (L)	1.97	-0.22	-10.0
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SOS	40.00	16.87	Sungard Data Systems	30.75	0.19	0.6
SYNT	20.93	7.75	Syntel Inc.	11.63	-0.38	-3.1
TECO	44.68	18.00	Tech Data	37.44	-1.06	-2.8
TENF	76.87	16.00	TenFold Corp. (L)	16.00	-2.75	-14.7
TSS	20.62	14.12	Total System Servicesinc	18.50	-1.06	-5.4
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CSCO	82.00	25.93	Cisco Systems Inc.	53.69	1.13	2.1
ECIL	39.43	23.75	ECI Telecom	25.06	-3.00	-10.7
ENTU	150.00	16.87	Entrust Technologies Inc.	42.75	-4.56	-9.6
HRS	40.62	15.50	Harris Corp.	29.13	-0.88	-2.9
GMH	140.00	48.75	Hughes Electronics/GM	94.75	7.69	8.8
ERICY	26.31	6.59	LM Ericsson	18.00	-0.75	-4.0
JNPR	312.93	11.33	Juniper Networks Inc.	148.31	-14.94	-9.2
LU	84.18	49.81	Lucent Technologies (L)	55.00	0.00	0.0
MAOGF	17.37	1.43	Madge Networks	3.50	-0.19	-5.1
NCOI	9.62	1.31	Network Computing Dev	1.59	-0.25	-13.6
NWK	14.81	7.31	Network Equipment Tech.	8.19	0.00	0.0
NN	43.62	14.00	Newbridge Networks	35.50	2.50	-6.6
NOK	60.00	16.92	Nokia Corp.	47.81	-0.81	-1.7
NT	72.09	16.64	Northern Telecom Ltd.	51.50	2.38	4.4
PAIR	28.87	8.00	Pairgain Technologies Inc. (H)	25.81	0.31	1.2
PCTL	15.21	2.75	Picturetel	2.91	0.53	15.5
SFA	77.00	15.84	Scientific Atlanta	51.06	4.19	-7.6
TLAB	77.25	41.81	Tellabs Inc.	60.31	0.81	1.4
USW	81.50	51.50	US West	71.00	-1.13	1.6
VRLK	22.00	1.81	Verilink	6.38	-0.88	12.1
WSTL	40.75	5.50	Westell Technology Inc.	13.13	7.69	36.9
SEMICONDUCTORSCHIPS & EQUIPMENT OFF -3.5%						
ADPT	63.56	15.43	Adaptec Inc. (L)	18.00	-0.31	-1.7
AMD	92.87	15.62	Advanced Micro Devices	73.06	-11.08	-13.2
ALTR	108.00	30.00	Altera	77.63	-2.25	-2.8
AOI	94.68	17.53	Analog Devices	67.25	-1.88	-2.7
AMAT	115.00	25.37	Applied Materials	73.88	-5.81	-7.3
ASML	50.25	12.12	ASM Lithography Holding	35.81	0.69	2.0
FCS	49.50	18.50	Fairchild Semiconductor Corp.	40.13	-4.00	-9.1
HRS	40.62	15.50	Harris Corp.	29.13	-0.88	-2.9
INTC	145.37	50.12	Intel Corp.	116.72	-1.88	-1.6
KLAC	97.75	21.18	Kla Instruments	44.28	-7.59	14.8
LLTC	62.50	24.25	Linear Technology	54.63	2.25	4.3
LSI	90.37	16.71	LSI Logic (H)	45.31	-0.50	-1.1
MXIM	74.50	24.50	Maxim Integrated Products	56.75	0.88	1.6
MU	72.65	17.12	Micron Technology	64.88	3.75	6.1
MOT	184.62	76.18	Motorola	92.06	1.69	1.9
NSM	85.93	12.25	National Semiconductor	48.00	-6.38	-11.7
STM	73.87	16.97	SGS-Thomson Microelectronics	58.63	-0.75	-1.3
SLR	49.50	24.15	Solectron Corp.	30.31	-2.00	-6.2
TER	115.43	21.84	Teradyne	72.38	-11.19	-13.4
TXN	99.78	25.07	Texas Instruments (L)	66.81	-1.56	-2.3
JDSU	153.42	14.89	Uniphase	78.16	-4.97	-6.0
VTSS	115.68	22.37	Vitesse Semiconductor Corp	44.81	-4.03	-8.3
XLNX	88.43	19.50	Xilinx	66.31	5.44	8.9
COMPUTER SYSTEMS OFF -8.4%						
AAPL	150.37	40.93	Apple Computer Inc.	86.69	-8.88	-9.3
ASPX	19.00	3.87	Auspex Systems	5.13	-1.13	-18.0
BEOS	39.56	3.28	Be Inc.	4.06	-1.16	-22.2
CPQ	34.00	18.25	Compaq	26.00	-1.31	-4.8
DELL	59.68	31.37	Dell Computer Corp.	41.38	-5.13	-11.0
GTW	84.00	28.37	Gateway 2000 Inc.	47.06	-2.69	-5.4
HWP	155.50	67.00	Hewlett-Packard Co.	118.50	-9.38	-7.3
HIT	164.50	67.00	Hitachi Ltd.	118.13	-2.63	2.2
IBM	139.18	89.00	IBM	106.50	0.06	0.1
MUEI	20.68	8.31	Micron (L)	8.31	-1.19	-12.5
MOT	184.62	76.18	Motorola	92.06	1.69	1.9
NATI	59.50	21.50	National Instruments Corp.	35.31	-3.06	8.0
NCR	52.62	26.68	NCR	41.19	4.19	11.3
NIPNY	149.50	53.18	NEC	121.06	-10.69	-8.1
PRCM	89.75	3.43	Procom Tech Inc.	23.31	-4.44	-16.0
SGI	18.87	5.63	Silicon Graphics Inc. (L)	5.63	-1.31	-18.9
SNE	157.37	44.62	Sony (L)	90.06	-9.09	-9.2
SUNW	106.75	26.96	Sun Microsystems	71.50	-5.50	-7.1
TRCD	22.75	1.53	Tricord Systems	9.25	-2.81	-23.3
UIS	49.68	19.50	Unisys	24.00	0.38	1.6
INTERNET OFF -13.7%						
AMZN	113.00	40.43	Amazon.com (L)	45.94	-7.19	-13.5
ADL	95.81	38.46	America Online	49.00	-4.25	-8.0
ATHM	83.12	15.87	@home Corp.	18.00	-1.81	-9.1
CKFR	125.62	23.12	Checkfree	38.00	-6.38	-14.4
CYCH	17.68	4.37	Cybercash Inc. (L)	5.06	-1.97	-28.0
EBAY	127.50	35.14	eBay Inc.	59.56	1.06	1.8
ETYS	86.00	4.50	eToys Inc.	5.03	-1.50	-23.0
EGRP	60.43	13.12	ETrade Group Inc. (L)	14.88	-4.56	-23.5
LCOS	93.62	28.56	Lycos Inc.	58.25	-2.31	-3.8
OMKT	65.50	7.87	Open Market Inc.	9.75	-0.94	-8.8
DTEX	60.62	9.50	Open Text Corp.	17.50	-5.38	-23.5
PCLN	158.87	33.06	Priceline.com Inc. (L)	35.44	-9.63	-21.4
PRGY	35.43	8.25	Prodigy Communications	10.06	-1.53	-13.2
PSIX	60.93	15.53	PSINet Inc.	23.19	-3.19	-12.1
RSAS	93.06	15.87	Security Dynamics	52.69	-1.69	-3.1
SPYG	95.25	9.68	Spyglass Inc.	26.50	-9.38	-26.1
WINK	75.00	6.00	Wink Communications Inc.	21.38	-1.50	-6.6
YHOO	250.06	55.00	Yahoo Inc.	112.13	-12.13	-9.8
STORAGE & PERIPHERALS OFF -5.1%						
ADPT	63.56	15.43	Adaptec Inc. (L)	18.00	-0.31	-1.7
APCC	45.00	15.75	American Power Conversion	30.75	-0.25	-0.8
CANNY	49.37	23.00	Canon Inc.	41.81	-0.06	-0.1
DBD	32.75	19.68	Diebold Inc.	29.63	0.13	0.4
EK	79.81	53.18	Eastman Kodak Co	59.13	2.25	4.0
EMC	145.43	47.31	EMC	106.31	-9.69	-8.4
IOM	6.37	2.87	Iomega	3.13	-0.25	-7.4
MXTR	14.81	4.25	Maxtor Corp.	10.38	0.94	-8.3
NTAP	124.00	9.84	Network Applinace Inc.	57.13	-10.19	-15.1
LXK	135.87	56.50	Lexmark International Group Nc	73.31	-13.56	-15.6
SEG	75.43	25.12	Seagate Technology	52.50	1.83	3.2
STK	27.18	10.81	Storage Technology (L)	10.81	-1.13	-9.4
TEK	71.75	22.12	Tektronix	49.94	-4.75	-8.7
XRX	63.93	19.00	Xerox	25.38	-0.81	-3.1

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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Microsoft

in companies with at least 500 employees, 22% said the antitrust case was becoming a factor in their IT planning over the next two years.

It's still a small number, but it may represent a crack in the dam of user interest. Those who cited an impact on their planning said the case was injecting uncertainty into their IT decision-making and either delaying or making them cautious about purchases.

Mike Matheny, IT director at Cracker Barrel Old Country Store Inc. a restaurant and retail chain in Lebanon, Tenn., said he has been thinking about using Windows systems, possibly as part of migration to Windows 2000, for some mission-critical applications that now run on Unix systems. But he is trying to gauge the trial's effect on Microsoft Corp.'s products and support.

"We hoped that we would be changing with [Windows] 2000," said Matheny. "I don't know if we made a hard decision or final decision, but I think [the case] is influencing us."

But most users — 76% of those surveyed — said the case wasn't a factor in their long-term planning.

"We're going to plan to stay with the Microsoft environment because we have too much invested in it," said Harold Creech, an information systems director at a Baltimore facility of medical supplies manufacturer Becton, Dickinson and Co. "I don't think the government is going to do anything stupid that would cause us to change our plans," he said.

Microsoft spokesman Mark Murray said he understands how the trial can raise questions in the minds of end users.

"Given the prominence of the case, it's natural for customers to want to know how it could potentially affect their business," said Murray. "We are going to do everything in our power to make sure that this case does not affect our product focus, product quality and service to customers, and we don't believe that it has."

However, many end users are concerned about the trial's impact on Microsoft. In the survey, 49% said the case was hurting the company's product and software development, while 33% said it was having no impact and 15% said it was helping development.

"The money that would be going to research and development is going to defend this case — that has to be making a difference," said Ray Yeager, senior vice president of information systems at Mutual of America Life Insurance Co.'s national telecommunications center in Boca Raton, Fla. But he said he sees no evidence of problems: "I really don't see any distraction yet," he said.

And Microsoft is also warning of problems. In court papers, it's predicting "chaos" and a mass exodus of employees if the breakup occurs.

Judge Jackson Sharpens His Scissors

There is little doubt that Microsoft Corp. antitrust trial judge Thomas Penfield Jackson intends to break up the company. The only remaining question: How many pieces?

Jackson's remedy could be issued this week, triggering an appeals process that will last one to two years, legal experts said. The government, in a revised brief filed Friday, didn't change its recommendation that Microsoft be split in two.

In a hearing on remedies last week, Jackson focused his attention on the breakup options.

He seemed to favor a proposal to split Microsoft three ways by also turning its browser business into a separate company. Two trade groups, the Computer & Communications Industry Association and the Software and Information Industry Association, prepared the brief. The government wants to split the applications and operating system into two businesses.

Jackson also dismissed Microsoft's plan to hold an extensive series of hearings on remedies. The company had assembled a list of 16 witnesses, including Bill Gates.

Microsoft attorneys were stunned but remained confident of their appeal odds. "We have several rounds to go," said William H. Neukom, Microsoft's vice president for legal affairs.

Once the remedy is issued, Jackson's immediate role ends. But an appellate court can send the case back to him, said Rich Gray, an antitrust attorney in Menlo Park, Calif.

But "Judge Jackson is making it clear that he's lost his patience with Microsoft's requests to prolong the proceedings," said Hillard Sterling, an attorney at Gordon & Glickson PC in Chicago. – *Patrick Thibodeau*

Analysts say they don't believe that Microsoft's counterattack to the government's case will necessarily change end users' decisions.

"End users realize that Windows is always going to be there," said Tony Picardi, an analyst at International Data Corp. in Framingham, Mass. And Picardi said he believes that Windows will improve if the company is broken up and becomes cross-platformed and componentized.

But for many end users, the ultimate impact of this case remains unknown.

"We don't know a lot — it's all speculation," said Jim Easton, information systems director at Air Industries Corp. in Garden Grove, Calif. "No one knows the impact." ◗

Continued from page 1

Airlines

nounced last week, said GetThere.com Inc. co-founder Bruce Yoxsimer.

GetThere.com, in Menlo Park, Calif., hosts the booking services for United's Web site. United owns 28% of GetThere.

"That customer data is going to be critical to anyone moving forward in this industry," Yoxsimer said. "Airlines want to know their customers intimately and build loyalty, and this deal would give United the largest database out there."

Representatives from United and US Airways declined to comment on this issue.

Jeffrey Osborn agreed with Yoxsimer. The Peachtree, Ga.-based analyst at Science Applications International Corp. said airlines are looking to create detailed and extensive customer databases to gain a competitive advantage.

"The reality is, that's a big part of this play. . . . [Customer relationship management] is everything right now," Osborn said.

United is the world's largest airline, while US Airways is the sixth largest in the U.S., according to analysts. The sizes of their frequent-flier databases weren't available last week.

Kate Rice, an analyst at online travel research firm PhoCusWright Inc. in Sherman, Conn., noted that airlines' frequent-flier programs are "among the most successful marketing tools ever" and that repeat customers are highly valued in industry circles.

High Fliers

UAL CORP.
Rank in Hoover's 500: 104
1999 SALES: $18,027M
FLEET SIZE: 590 aircraft

US AIRWAYS GROUP INC.
Rank in Hoover's 500: 236
1999 SALES: $8,595M
FLEET SIZE: 380 aircraft

SOURCE: HOOVER'S INC.

She cautioned that whether the real benefits of the deal lie in added customers or in added routes might not be apparent at this time. "A merger is never as simple as it looks," Rice said.

GetThere.com's Yoxsimer said merging the online sales operations of the two airlines shouldn't prove difficult. But, he said, uniting the frequent-flier programs may take a feat of engineering.

"The frequent-flier programs exist on these giant proprietary mainframe host systems, and these airlines have been very careful to guard that information," he said.

Analysts also saw potential fallout for the online ticketing Web site formed by United, Delta Air Lines Inc., American Airlines, Northwest Airlines Inc. and Continental Airlines Inc.

Site Probes

The Web site, dubbed T2 within the travel industry, last week learned it will go before the Senate Commerce Committee on June 22 to determine if it poses the threat of an airline ticketing cartel. Also, the U.S. Department of Justice has initiated a probe into the site, which the companies hope to launch this summer.

"This merger doesn't do T2 any favors," said Henry Harteveldt, a senior analyst at Cambridge, Mass.-based Forrester Research Inc. "This is going to make a lot of people nervous about competition in this industry."

He said that, as a way to prevent United from controlling too much of the airline industry, the merged company should be forced to give up its equity stake in the T2 site.

Fiona Swerdlow, a senior analyst at Jupiter Communications Inc. in New York, said she doubted that United would give up its T2 holdings without a fight. "The top, top airlines all want to be a part of this," she said. "United won't want American and Delta to be in there when they can't be."

Swerdlow added that T2 should get a fair hearing on its own merits.

"People may talk about [the merger and the T2 investigation] in the same breath, but they really are two separate issues," she said.

United CEO James Goodwin acknowledged the inevitability of government scrutiny during a press conference announcing the deal.

"In my opinion, there are two major hurdles," he said. "The first is to get US Airways shareholders to approve this transaction. I don't think that is a major hurdle. The real work ahead of us is the regulatory work."

T2 officials wouldn't comment on the merger between United and US Airways or its possible effect on them. ◗

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FRANK HAYES/FRANKLY SPEAKING

Micro-outsourcing

CALL IT MICRO-OUTSOURCING. Last August, an outfit called ITSquare.com set up a business-to-business exchange for software development. They don't use that term, but what else to call it? You have a software project; you spec it out and post it to the exchange; software development companies bid the job; you do the deal. ITSquare vets the developers who are bidding, provides tools for managing the projects and figures to make its money by taking a small percentage of what developers get paid for projects. The company claims that it can make almost any software project, no matter how small, a candidate for outsourcing.

ITSquare isn't alone. Since October, another company, Constructors Inc., has been running a similar exchange just for Web development projects at *www.econstructors.com*. And with B-to-B mania running hot, there could soon be a half-dozen other software-development exchanges out there.

Can micro-outsourcing work? So far, ITSquare and eConstructors can't wave around long lists of happy corporate IT customers singing their praises. Maybe micro-outsourcing is a solution. Maybe not. Nobody knows.

But right now we need *something*. We're telling users we can't deliver projects because we're understaffed. And we're telling Finance we need more money for salaries because the market for key IT skills is so tight. We're asking for more resources and we're not delivering results. How long does anyone think we can get away with that?

(Actually, last year we did get away with that — but only because nobody wanted to touch the IT staff until Y2k fixes were done. Now Y2k is old news, and IT is starting to look very expensive again — and a likely candidate to be outsourced itself.)

So why aren't we at least trying these newfangled B-to-B IT exchanges? Probably for all the wrong reasons.

Maybe we figure we can barely manage our own in-house projects, so micro-outsourcing will be impossible. If we're lousy at defining the specs, estimating the time and costs and tracking the work, we've got a problem all right — but we should be learning to manage, not using that as an excuse.

Maybe we believe the micro-outsourcers will make us look bad because they're so cheap, or because they can calculate what a project will cost before it starts. Hey, if we get a project on a more solid budgeting foundation, will that really tarnish our reputation?

Maybe we figure micro-outsourcing is a slippery slope, and we'll end up gutting our in-house development capability. It won't happen — or shouldn't, anyhow. There's no benefit in farming out the most interesting projects -- the ones that keep our developers fired up — or the projects that depend on in-depth knowledge of our users and business processes, our company's technology and internal politics.

We need to micro-outsource the plain-vanilla jobs.

The projects to micro-outsource are the plain-vanilla, heads-down, grind-'em-out jobs — or the ones too specialized for our people to handle anyway. The hard jobs we can't do are the perfect candidates to farm out — and the dull ones we don't really want to do, but users need, are the perfect jobs for testing the process.

Or maybe we're really just afraid of change. In that case, we should at least be looking at micro-outsourcing. Change will come anyway — the only question is whether it blindsides us.

Besides, the last thing we need is for some user department to discover a B-to-B IT exchange and use it to bypass us for small projects — and then have the CEO ask us why we in IT aren't using it too.

If we don't have a good answer for that one, the outsourcing "opportunity" we face may not have anything micro about it at all.

Hayes, Computerworld's staff columnist, has covered IT for more than 20 years. His e-mail address is frank_hayes@computerworld.com.

SHARK TANK

THIS IT MANAGER, working with a big-time consultant pilot fish on improving his company's IT processes, mentions in passing that on another project – a long-term, multimillion-dollar development job – the project lead wants to skip any tests with users and send the new application straight into production. "What? Why?" asks the fish. According to the project lead, no users are coming forward to claim the system and conduct the test. "Um," the fish replies diplomatically, "where did the application requirements come from?" ("Sometimes," she confides to Sharky, "keeping a straight face in front of the client is a consultant's best skill.")

BAD ANSWER IT consultant pilot fish shows up for his engagement at this nonprofit organization and immediately discovers the network is rife with Microsoft Word macro viruses. He asks the "systems consultant" who's already on board the obvious question – why has the virus problem been allowed to continue for so many months? Not my fault, says the sysadmin: "The trial version of the antivirus software on the server expired."

DITTO Pilot fish gets e-mail notification of a meeting – eight times. Followed by an apology. "This is a new system, and I misinterpreted an error message. Sorry," says the sender – eight times.

SENIOR PROGRAMMER pilot fish stationed on the East Coast is sent to company HQ in Phoenix for a managers' meeting. "The trip was to provide management with a 'new perspective' and make me feel 'a part of the team,' " says the fish. So in Phoenix, he meets with users and managers to map out improvements for a customer-service module. The new stuff is just what the users want – they go home jazzed and happy. The fish goes home and asks his boss for an implementation schedule. No schedule, says the boss – there's no plan to actually implement the new features. Then why send the fish to Phoenix? "Oh," says the boss, "that was all for show."

HOW ARE THE KIDS? Decidedly nontechie CIO interviewing potential-recruit pilot fish: "I'd ask you some technical questions, but I don't know any," he tells the astonished fish. "Let's just talk about you and the family."

With summer coming, Sharky figures there's something to be said for hiring IT people according to their ability to barbecue. Technology changes, but charcoal doesn't. Grill up a useless user, venal vendor or benighted boss: **sharky@computerworld.com**. If it prints, you get a T-shirt. And get more online every day at *computerworld.com/sharky*.

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CONFERENCE AGENDA

Sunday, June 18, 2000

12:00pm - 5:00pm
Registration

7:00pm - 9:30pm
Pre-Conference Networking Reception

Monday, June 19, 2000

8:30am - 9:00am

Welcome and Opening Overview
Maryfran Johnson, Editor-in-Chief
Computerworld

9:00am - 9:45am

Opening Keynote: "IT Leadership vs. E-Leadership"
Charlie Feld, E-Leader and former CIO, Delta Airlines
CEO, The Feld Group

10:00am - 11:30am

Moderator

"The Naked Truth About B2B E-Commerce"
Kevin Fogarty, Business Editor
Computerworld
Panelists:
Robert Schwartz, VP & GM, Panasonic Corp. • Kathy Brittain-White, CIO & EVP, Cardinal Health (cardhealth.com) • Peter Burrows, CTO, Reebok International • John Keast, CIO/CTO, NetworkOil • Bruce Carver, VP of Informational Management and Technology, Reynolds & Reynolds

11:30am - 12:15pm

Insider View: "Raytheon Corp.'s Unfolding E-Business Strategy"
Eric Singleton, Director of Global E-Business
Raytheon

12:30pm - 1:45pm
Interactive Luncheon with IT Leaders

2:00pm - 3:30pm

Moderator

"Enterprise Security: Will Only the Paranoid Survive?"
Priscilla Tate, President
Technology Managers Forum
Panelists:
Scott Charney, former head of computer crime investigations, U.S. Department of Justice and now Principal, PricewaterhouseCoopers • Allan Paller, Columnist, Computerworld and Research Director, SANS • Tim Talbot, VP of Technology Management, PHH Vehicle Management Service • Bob DiStefano, CIO, The Vanguard Group • John Puckett, CIO, Toysmart.com

3:30pm - 4:15pm

Afternoon Keynote: "Innovation & Change"
Thornton May, VP of Research
Cambridge Technology Partners

4:30pm - 5:00pm
NCR Presentation

5:00pm - 5:30pm
Palm Mobile Solutions Session

5:30pm - 8:30pm
Expo Open and Reception/Buffet Dinner

Tuesday, June 20, 2000

8:45am - 9:00am
Remarks and Day Two Overview

9:00am - 9:45am

Keynote
David Lord, CEO
Toysmart.com

10:00am - 11:30am

Moderator

"ASPs: The Double-Edged Sword of Outsourcing"
Mark Hall, West Coast Bureau Chief
Computerworld
Panelists:
Dick Hudson, CIO, Global Marine • John Voelker, CKO, CTO & SVP, Black & Veatch • Sateesh Lele, President, Lele Consulting Group • Tsvi Gal, CIO, CTO & VP of Mergers and Acquisitions, GBS • Mark Mathias, President, Eureka Digital • James Lubinski, EVP, Galileo International

11:30am - 12:15pm

Featured Speaker: "Strategies for Success in the Internet Economy"
Peter Solvik, Senior Vice President and CIO
Cisco Systems

12:30pm - 2:00pm
Buffet Lunch and Expo Open

2:00pm - 3:30pm

Moderator

"Walking the E-Customer Tightrope"
Julia King, Senior Editor
Computerworld
Panelists:
Cathy Hotka, VP, National Retail Federation • Joseph Smialowski, Vice Chairman, Fleet Boston Financial • Robert Rubin, CIO, Elf Atochem North America • Manoj Tripati, CIO and Vice President, Jamba Juice • Gary Cooper, VP Information Systems, Tyson Foods • John Plummer, IT Division Manager, Corning

3:30pm - 4:15pm

Insider View: "Taking Care of E-Customers at Autobytel"
Ann Delligatta, COO
Autobytel.com

4:15pm - 4:45pm
Hewlett-Packard Presentation

4:45pm - 5:15pm
Premier Sponsor Presentation: To Be Announced

5:15pm - 7:00pm
Expo Open and Reception

7:00pm - 9:00pm

Premier 100 Awards Presentation and Gala Dinner
Featured Keynote: Jim Yost, CIO
Ford Motor Company

Wednesday, June 21, 2000

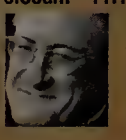
8:45am - 9:00am
Remarks and Closing Day Overview

9:00am - 9:30am

Moderator

"How to Win the Hiring War Between the 'Dots' and the 'Nots'"
David Weldon, Careers Editor
Computerworld
Panelists:
Irene Oec, VP of International Investments, Prudential Insurance Co. • Margaret Schweer, HR Director, Kraft Foods • Robert Bruce, CIO, Allmerica Financial • David Foote, Managing Partner, Foote Partners LLC • Jim Prevo, CIO, Green Mountain Coffee • Fran Quittel, Columnist, Computerworld

10:30am - 11:15am



Closing Keynote: "Putting All the Pieces Together: The E-Management Difference"
Peter Keen, Author, *The eProcess Edge*, and Chairman
Keen Education

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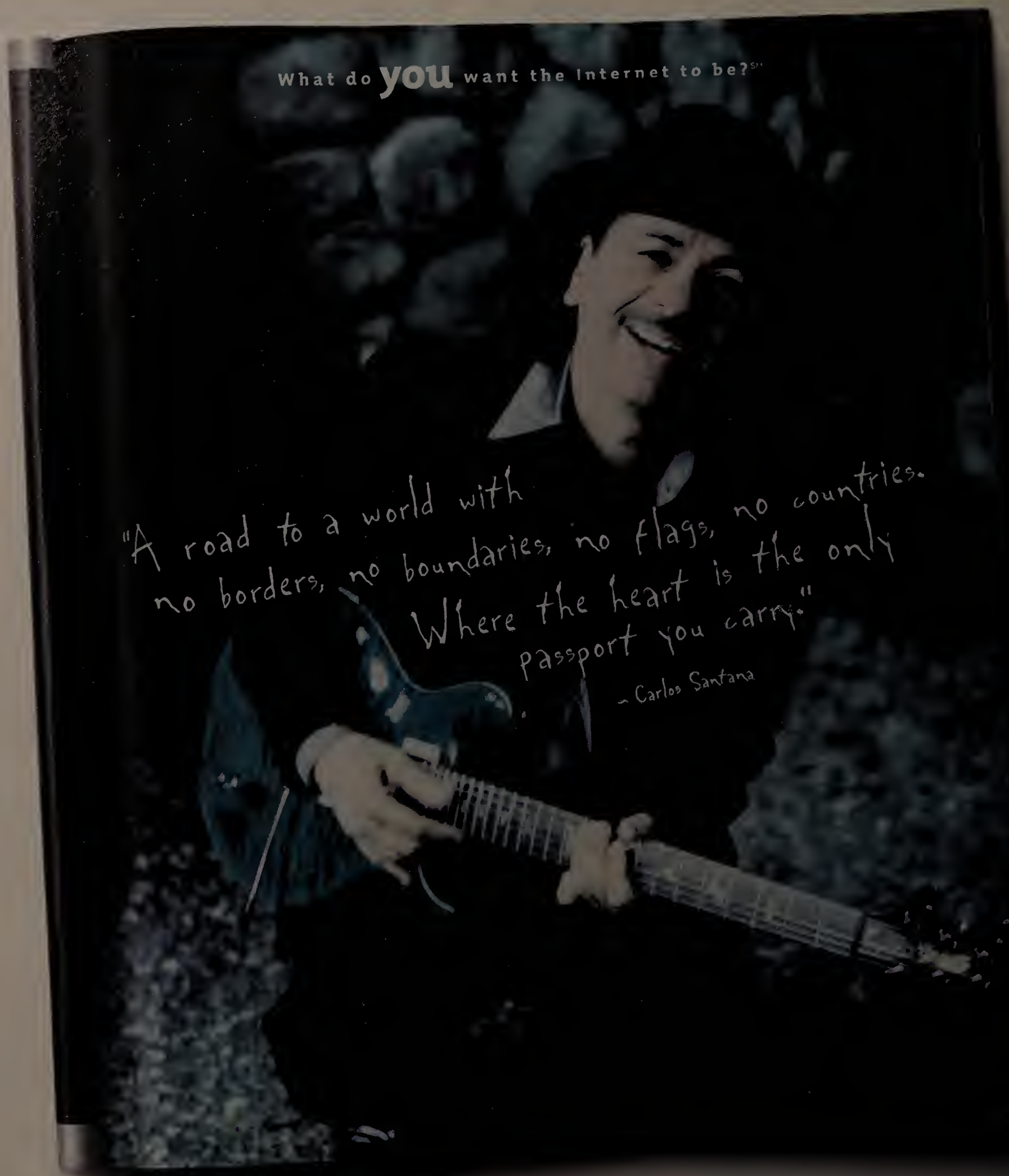

Internet Telephony

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